PT7
The other terminal for IBM and ICL mainframes
FERRANTI

COMPUTER WEEKLY

'Plan now for the future impact of technology' call

THE need to plan for the future impact of technology before it is too late was emphasised last week by Earl Joseph, staff scientist and futurologist at Univac, and consultant Iann Barron.

Speaking at an Infotech seminar entitled "Planning for Tomorrow's Technologies," Joseph highlighted education, health services and the effect on work styles as three areas where information technology will have a major impact., while Barron reiterated his Hedsor Park call for a Minister of Information Technology.

"Schools are very slow to implement new ideas," Joseph said. "One of the high risk routes for them to follow in the future is to assume that education will be delivered the same way as it is today. But you do not need to teach in a school building.

"Instead you can set up a system through communications satellites in the house, and the cost will be significantly less than it is at the moment.

"Also, there is the possibility of having robotic teachers. We know enough to do that, but we now have to create the software. What would it matter if the teacher was a 3D image, like a hologram?"

Joseph also looked to the future to supply personalised, wearable computing machines.

"What about a hospital-less health system?" he said. "We could have a personalised computer wristwatch that can take your pulse and monitor and release chemicals into your bloodstream. We already know how to do that."

In the past, major technological changes and their impact on society did not happen quickly, but Joseph believes that this is no longer the case. He sees the rapid changes in society, observable in our own lifetime, as a real turning point.

The need to prepare for rapid technological changes was the main theme of Iann Barron's talk.

"We must have policies before decisions are taken—or are made for us," said Barron, in calling for the development of national policies to cover the whole range of social, economic, political and industrial areas affected by the impact of information technology.

He also said that the "call for action" for the development of such policies which followed the ACM/Computer Weekly conference "Can computers save Britain?" (CW, July 14) should be headed by the computer community and that the action should not be delayed too long — or it might be too late.

● A team of forecasters at the Henley Research Centre has produced a report called "2002: Britain Plus 25"* which looks to the future shape of society, including the effects of the computer / communications revolution.

It predicts that the average household of the future will rely on computer-based appliances.

*2002: Britain Plus 25, The Henley Centre for Forecasting, 22 St John's Square, London, pp184. £30 or £25 to subscribers.

Earl Joseph . . . possibility of robotic teachers.

NEWS IN BRIEF

Norsk wins USAF contract

THE contract to supply minicomputers for the US F16 fighter simulator has been won by Norsk Data of Norway (CWI, November 10). Under an $8 million contract the minis will be supplied to Singer's Marine and Aerospace Division, which is building 18 simulators, each with four Nord 50 32-bit processors and a Nord 10/S front-end.

The contract went to Norsk Data because the company is the only one with a 32-bit mini capable of running under the same operating software as the 16-bit front-end mini. This operating system is Norsk Data's Sintran III.

Philips launch

TWO small business computers, the 330 and the 430, have been announced by Philips in the US. They have not yet been announced in Europe.

Delivery stage

A CONTROVERSIAL computer order has reached the delivery stage with the installation of a Honeywell Level 66 at the Huntingdon headquarters of the Anglian Water authority ordered the system after a year of wavering between Honeywell and ICL (CW, April 28).

Train death

THE inquest on Warwick University computer science lecturer Ronald Footitt, 30 of Whitnash, Leamington Spa, was adjourned until a date to be fixed. His body was found south of Kilsby tunnel, Northants, on the main Euston-Birmingham railway line. He leaves a wife and a young son.

Brian Long to take over at Honeywell

A MAJOR reorganisation of Honeywell's UK business has been announced by managing director Russ Henderson. Brian Long will take over as managing director when Henderson returns to the US in the second half of 1978.

Long has been appointed deputy managing director in the interim, and his elevation will honour Henderson's commitment when he arrived last January to name a Briton as his successor.

The UK company has been restructured along product rather than geographic lines, and sales and support staff will be much more specialised than previously in terms of product.

Long . . . to be managing director.

The new Data Processing Division embraces Level 66 and the whole of the Xerox base of 40 customers. The General Systems Division takes in Level 64, Level 62 and the small amount of business still done on Level 61. The Minicomputer-Terminals Division covers Level 6 and the terminal business.

It is planned to run Incoterm independently to start with, once the acquisition is complete. The UK Incoterm company has about 75 people, mainly in sales.

Backing up his belief that the decision to build Level 66 in France would not adversely affect the large systems factory at Newhouse, Scotland, Henderson told Computer Weekly that of the 50 to 55 Level 66 machines built at Newhouse in the current year, only 10 or 12 had gone to CII-HB. "The remainder have gone to the UK, Italian and subsidiary markets like Iran and Yugoslavia," he said.

"We are likely to make a firm decision to build Level 6 minis at Newhouse next year, and I don't believe that the French decision will have any effect on output from the Scottish factory for the rest of the life of Level 66."

The successor line to Level 66 is likely to begin appearing in the early 1980s.

Honeywell's UK business is now over £50 million a year, and the plan is to double this in four years.

Honeywell has put in for a Queen's Award for export achievement.

Series 1 net for food group

A MAJOR IBM user, International Stores, is to install a network of five IBM Series 1s, attached to its central IBM 370/145 at Swanley, Kent. Altergo has been contracted to write the software for at least the initial order processing system.

The Series 1s will be installed at the company's five major warehouses, which supply most goods to their local retail outlets.

Under the initial system, orders from the branches will be input to the appropriate Series 1, which will issue a picking note, telling warehouse staff to collect the stock, and a charging note to the retailer. The alteration in the stock at that depot will also be recorded.

500 reply to Cobol survey

A GOOD response has been reported by the National Computing Centre to its efforts to obtain a picture of Cobol use in the UK, on behalf of the EEC.

Out of 2,000 questionnaires on Cobol use sent out to installations, over 500 have already been returned.

The survey is being organised by a sub-group of the EEC's working group on standards, which is investigating the need for Cobol standardisation and the problems of portability.

The questionnaire has already been circulated in France, West Germany and the Republic of Ireland.

Questions about IBM top lawyer

From Hesh Wiener in New York

EVIDENCE has emerged in the US that Nicholas Katzenbach, IBM's general counsel and vice-president of the corporation, was informed of the investigation that led to the US government's anti-trust suit against IBM as early as 1964, over four years before the US government actually filed the suit.

At the time he was made aware of the investigation, Katzenbach was Deputy Attorney General of the US.

Evidence that Katzenbach was alerted to the investigation is in a memo sent to him by William H. Orrick, who was then head of the Justice Department's Anti-trust Division.

Existence of the Orrick memo sheds new light on the recurring question of Katzenbach's possible conflict of interest, a conflict that the attorney has consistently and steadfastly denied.

Any proven conflict could be a violation of the code of legal ethics and US law. It could also interfere with the conduct of the government's anti-trust suit, which is now in progress. Katzenbach was hired to work on IBM's defence in the litigation.

Complicating Katzenbach's situation is the recent statement, issued through an IBM spokesman, that IBM had approached Katzenbach to work for the corporation in November, 1964. Katzenbach finally joined IBM in January 1969, within days of the filing of the government anti-trust suit.

First bubbles

US sources suggest that the first IBM computers incorporating bubble memory will be the System 36 and System 38 scheduled for introduction early next year as replacements for the System 3/12 and 3/15. They will be developments of the System 34 transaction processing system.

Takeover

A LEADING US manufacturer of video based word processing systems, the Lexitron Corp of Chatsworth, California, is being acquired by the Raytheon Company, US parent of Raytheon Cossor. The UK firm is unable to say yet when it will start selling Lexitron products in Europe.

'Amicable' split

COMPELEC Electronics' managing director, Martin Underwood, has quit, in a split that has been termed "amicable." His 29 per cent stake in the company has been purchased by the majority shareholders. Roderick Versluys has taken over as acting managing director, until a full-time successor is appointed.

32-bit challengers

FOLLOWING the announcement of the VAX-11/780 by Digital Equipment (CW, October 27), Data General is expected to bring out its own 32-bit challenge early next year. At about the same time, the established 32-bit mini builder, Systems Engineering Laboratories, will launch a range of 32-bit machines priced significantly below existing models.

Norwegian net

DESIGN of IBM Series 1 software for International Stores (CW, November 24) is not the first Series 1 project gained by Altergo. The consultancy is already working on a Series 1 word-processing network for an unnamed user in Norway.

INTERNATIONAL BROKERAGE & LEASING

RENTAL CREDIT

At last in the U.K. after operating for many years in Europe.

Being originally a European company, IBL has a great deal of experience in turning Rental Credits into savings in the D.P. Budget.

We would be pleased to advise you of the many ways rental credits can be used which will best suit your needs.

Call John Henderson
IBL COMPUTERS LIMITED
Tel: 01-890 7158
Telex: 8951179

Unit 4B, Unitair Centre
Great South West Road
Feltham, Middlesex
TW14 8NT.

CORAL 66 COMPILER FOR PDP-11

The RMCS CORAL 66 compiler for the PDP-11 is obtainable with full maintenance and support from:

HUGH PUSHMAN ASSOCIATES (COMPILERS)
Newfoundland House, The Quay,
Poole, Dorset BH15 1HJ
Tel: Poole (02013) 70510 or 70367
Telex: 41496

HPAC

TOTAL SYSTEM MAINTENANCE
...the way to trouble free computing

Whether your computer system is from a single manufacturer, or includes a number of different manufacturers' equipment, DPCE provides a total system maintenance service.

- No debates about who is responsible
- No awkward gaps in maintenance cover
- Regular preventive maintenance avoids trouble
- Experienced engineers, who have earned their reputation maintaining large, complex real time systems (including British Airways)

DPCE is the largest independent computer maintenance company outside the USA.

D.P.C.E.
Data Processing Customer Engineering Proprietary Limited
81 Hersham Road, Walton-on-Thames, Surrey KT12 1RJ
Telephone: Walton-on-Thames 20582/3 Telex: 894566

Printed in Great Britain by Q.B. Limited, Sheepen Place, Colchester, CO3 3LJ, and published by IPC Electrical-Electronic Press Ltd., Dorset House, Stamford Street, London, SE1 9LU.

PT7
The other terminal for IBM and ICL mainframes
FERRANTI

COMPUTER WEEKLY

Number 578 Thursday, December 1, 1977 Price 18p

Data Preparation
We have the capacity to punch your peak loads, file set-ups or regular work on 80 Column cards
Croydon: Nada Waugh 01-681 2686
Warrington: Ron Myer 0925 53391
Lowndes-Ajax Computer Service
COM
Remote Computing
VM/CMS plus

Briefing

Cossor wins Lords order

THE House of Lords library has placed a £60,000 order for a Raytheon Cossor PTS 1020 terminal system for use in extension of the library's pilot information retrieval project.

The terminals will be used in accessing information such as registers of procedural precedents and titles of Acts of Parliament. The seven-terminal system will be installed during the Christmas recess, and will be linked to an IBM 370/158 at the Greater London Council, which is now negotiating an extension to a one-year contract for providing the Lords with computer power (CW, March 11, 1976).

IBM prices up

RENTAL and lease prices in the US for some older IBM products will go up by about 5% in the spring. An IBM spokesman could not say at this stage whether the increases will also apply in Europe and the UK. Products affected include System 32, System 7 and some models of the System 3 range.

Cautiously Prince Charles tries his hand with a light pen on a graphics terminal linked to the IBM 370/158 at Lloyds Register of Shipping. During his visit to Lloyds the Prince experimented with the interactive graphics system which is used for appraising ship structures. With the light pen a surveyor can make changes to a three-dimensional display of a plan which can be shown in any plane.

Plato to aid South African blacks

DESPITE a corporate decision to suspend new investment in South Africa, Control Data is planning to set up its Plato computer assisted instruction system there as a training service for blacks, and subsidised by the South African Government and industry.

CDC is currently sounding out government, businesses and church organisations in South Africa about the possibility of funding the project on a consortium basis. After 18 months talking there has been a general expression of interest by the South African government but no firm commitment, according to Control Data vice-president Roger Wheeler.

"The prime aim would be remedial and skill training for blacks," said Wheeler. "The service would be available to businesses, too, but this would be a secondary activity and revenue from it would help subsidise the primary service."

If it gets a commitment Control Data will install a mainframe in South Africa to support the Plato system.

Otherwise Control Data has announced that it will "not enlarge its holdings" in South Africa because of the government's clampdown on black newspapers and black leaders.

£50m boost for micro industry

By Martin Banks

THE Department of Industry will announce proposals early in the New Year for investing a total of £50 million in the British microelectronics industry over the next five years. A number of investment programmes are being considered but the final details will not be decided for a few months, although the DoI is keen to act quickly to stave off competition from similar European investment programmes.

Though the policy has not been finalised, it is clear that one of its probable results would be increased pressure for bringing together the microelectronics activities of the three main British beneficiaries of such support: Plessey, Ferranti and GEC Semiconductors.

For it is likely that the DoI will seek close cooperation between any companies in which money is invested.

Two main programmes are under consideration.

The first, thought by the DoI to be the more urgent, will cover both the manufacturing and applications of microelectronics and large-scale integration technologies in the UK. Both indigenous and foreign-owned companies will be eligible, the main criterion being that an investment makes industrial sense.

The second programme will take a broad approach to the application of microprocessors and microcomputers.

The need for urgency that the Department must feel can be gauged from the recent investments announced by the French and German governments for similar support programmes. Each country is prepared to spend an equivalent of £50 million over five years.

The DoI spokesman stated that its own programs would be comparable to these. It seems probable, however, that the actual support will be less than this, as the Department has already committed considerable sums to microelectronics as part of the £20 million support scheme for the total electronic components industry, announced earlier this year. The final total is likely to include this sum.

As the details of the programmes have still to be finalised and cleared, it is not yet certain whether they will follow the same pattern as this earlier support, requiring any company seeking an investment to put in at least the same amount again. The spokesman said that the Department recognised the fact that the industry could have problems in finding its share, so the degree of partial funding had still be decided.

In the microcomputer field, Plessey is centring its operations

● Turn to page 14

HOW did you get your last job? Have you been satisfied with the service you have received from computer recruitment consultancies? Computer Weekly is conducting a survey to find out your views on the job hunting scene. Page 15

370 connection

AN interactive graphics system for connection to its 370 mainframes has been announced by IBM. Called the 3250, a system with four display stations would cost about £130,500. First shipments are due in the last quarter of 1978.

CRC chiefs resign

TWO of the top men in the CRC Group, managing director Barry Quirke, and his deputy, Rod Pearson, have resigned from the company following a board meeting on November 22.

Earlier this year CRC was taken over by the giant French bureau, Générale de Service Informatique (CW, June 9). A statement from the company said that GSI disagreed with Quirke and Pearson's style of management.

The man taking over as managing director of CRC is Ian Auld, one of the original directors of the Honeywell time sharing service in the UK. For the last four years he has been working in the United States, for most of the time as vice-president marketing and sales with the Rapidata time sharing bureau.

CRC's time sharing bureau service, Cybernet, is used all over the UK and also on the Continent via nodes in Paris and Frankfurt.

New Japan challenge to IBM

ANOTHER Japanese mainframe manufacturer is seeking to enter the US market with IBM-plug-compatible CPUs. A spokesman for OPM Leasing Services of New York confirmed to Computer Weekly that OPM is talking with a Japanese manufacturer but declined to name it.

Only Fujitsu and Hitachi build CPUs similar to IBM's 370 line; Hitachi supplies Itel; and Fujitsu is linked with Amdahl.

A Fujitsu spokesman in California declined comment on the possibility that his company might find other US outlets for the machines it builds below the level of Amdahl's 470V/6.

Nippon Electric has also been named as a possible new contender for the market.

Control System

Every company is subject to financial audit, even when there is no reason to suspect a problem. Data Logic applies the same principle to software development.

Our Technical Assurance staff examine every project on a regular basis. They are also empowered to carry out a full audit on any project at any time. At their discretion. A full audit means what it says. It covers technical quality, liaison with the client, conformance with specification, observance of our strict project procedures. It can take many man weeks.

Even the best project teams meet problems. Ours are less likely to than most. But if they do, we'll know it. We'll face it honestly. And react quickly.

It's one of our ways of ensuring that we deliver what we say. When we say.

Data Logic Limited
Westway House
339 Ruislip Road East
Greenford
Middlesex UB6 9BH
Tel: 01-578 9111

Data Logic

COMPUTER WEEKLY'S INSIDE NEWS

OFFICE VIEW
There is much speculation about the office of the future and electronic systems that it will contain. One system that is likely to play a prominent role is Videotex, the information service developed by the Post Office. Sam Pedida, of the corporation's computer research applications division, describes the services that could be provided. Page 20

MACHINE VICTORY
We may have a long way to go yet before we get to the era of thinking machines, but some steady pro- gress has been made in the world of computer chess. In Seattle in October, International Master David Levy was beaten by CHESS 4.6 and by DUCHESS. In a Guest Chessiab Danny Kopec reports. Page 14

THE DATA COLLECTION
The growing collection of data about people to serve the alleged needs of complex modern society presents many dangers to the individual. Patricia Hewitt, of the National Council for Civil Liberties, looks at what she calls the invasion of privacy. Page 4

ALSO . . .
Computer view — on a national middle 2
Focus on DPM salaries 2
Three-second scanner 3
Datatime 4
Rising star of hobby market 5
Glib's Mythodology 6
Puzzler 6
Software File 6/7
Programmer Notes 7
People in the News 10
Micro news 12
On Spot 13
Letters to the Editor 17
Berlei leads way with 2950 21
European privacy law aim 48

MIDLANDS JOBS—PAGES 24-27 APPOINTMENTS—PAGES 24-47

COMPUTER WEEKLY

Vol. 23 No. 678
Thursday, December 1, 1977

Editor:
Malcolm Peltu 01-261 8933
Deputy Editor
Tony Higgins 01-261 8686
Advertisement Manager.
John A. Godley 01-261 8359
Class Ad Manager:
Mike White 01-261 8026

IPC Electrical Electronic Press Ltd, Dorset House, Stamford Street, London, SE1 9LU. Telephone: 01-261 8000 Telegrams/Telex: 25137 BIAPRS G

Branch Offices:
Birmingham: 202 Lynton House, Walsall Road, Birmingham 22B. Telephone: 021-356 4838
Manchester: Statham House, Talbot Road Stretford, Manchester M32 Telephone 061-872 4211
New York: 205 East 42nd Street, New York NY 10017. Telephone: (212) 867 2080. Telex: 421710
Published weekly on Thursday
Registered at the Post Office as a newspaper. Price per copy 18p
© IPC Business Press Ltd. 1977

Members of Computer Weekly staff may be contacted directly on the extensions listed below. Other departments in Dorset House may be obtained by dialling (01) 261 8000.

EDITORIAL

Keith Jones	261 8344
Tim Palmer	261 8031
John Kavanagh	261 8028
Stephen Ball	261 8303
Martin Banks	261 8808
Robin Webster	261 8170
Bernard Allen	261 8035
Mike Marples	261 8042
Dan Mitchell	261 8413
Darshi Rampal	261 8943
Chris Yeoett	261 8042
Nancy Pocock	261 8543

ADVERTISING
Display

Stephen Measures	261 8293
Tony Kaminski	261 8022
Lloyd Collins	261 8757
Stuart Moore	261 8109

Manchester

Harry Aiken	061-872 4211

Birmingham

Ken Parrot	021-356 4838

Classified

Steven Bass	261 8174
Jill Andrews	261 8484
Mark Williams	261 8019
John Graham	261 8097
Anne Wilson	261 8098

Manchester

Owen Kelly	061-872 4211

Birmingham

Allan Escott	021-356 4838

Production

David Abbey	261 8016
David Malsed	261 8878

Computer Weekly is sent free of charge to the following categories in the UK and the only: Company directors, company secretaries, management services executives, civil servants responsible for computing, management/computer consultants, lecturers and teachers, DP Manager/supervisors, systems analysts/O&M officers, programmers, operators, computer salesmen, field engineers.

Controlled Circulation Department IPC Business Press (Sales & Distribution) Ltd. 40 Bowling Green Lane, London EC1R 0NE. Tel: 01-837 3636.
Subscriptions for readers outside the above categories: One year, UK and overseas £14.50, US and Canada $37.75. Students, UK and Overseas £7.25, US and Canada $18.88. Airmail rates on request.
Subscriptions: IPC Business Press (Sales & Distribution) Ltd. Oakfield House, Perrymount Road, Haywards Heath, Sussex RH16 3DH. Tel: 0444 59188.
Back numbers can be had on application for 40p post free.

Circulation: 76,685 with the highest fully requested circulation in the UK.
International Edition (10 issues a year) Circulation 95,219 (UK 76,081 Int 19,138)

ISSN 0010-4787

COMPUTERVIEW

Neddy fiddles while British software burns

POLITICIANS, civil servants, union officials, city financiers, businessmen and others who have their hands on the levers of power prefer simplicity to subtlety.

They seem to understand only the simplest of equations. Like the fact that hardware production, be it of motor cars or computers, equals more employment, equals increased prosperity. Hardware is tangible and easy to understand, but it is far more difficult to get to grips with *concepts* like software or knowledge industries.

Last week, Computer Weekly revealed that some of the discussions of the manpower subcommittee of the Neddy computer sector working party actually involved criticisms from some quarters of the British services industry – because systems houses are doing too much work on foreign machines.

Fortunately, there has been sufficient opposition to some of the more extreme suggestions discussed by the sub-committee to water down the criticisms before the report is made public.

Yet the mere fact that this type of discussion can take place on a body aimed at boosting the British computer industry is a sign of the trouble that we are in.

The work of the manpower sub-committee in fact highlights the sorry state of any national policy towards information technology.

Neddy is just one of a number of bodies involved in some way or other in looking at the information technology industry. Other bodies include the Department of Industry; Science Research Council; National Committee on Computer Networks; Computers, Systems and Electronics Requirements Board; National Enterprise Board; etc.

Some of the work of some of these bodies is far-sighted and relevant. The Neddy manpower sub-committee, for example, will be making some valuable recommendations regarding investment in training and developing computing manpower.

The lack of co-ordination between these groups, however, means that even the good work is dissipated while the strong political forces – nationalism, protectionism, short-term mass job preservation, etc – can play an unduly prominent role in final decision-making.

At the Hedsor Park conference (CW, July 14), one of the strongest messages to emerge was the call for a policy – *any* policy – towards the information technology industry and the impact of information technology on society.

However, the disarray of the current situation was illustrated recently when the government ignored Neddy's advice to extend its procurement policy to include minicomputers (CW, August 4).

The government explicitly excludes machines smaller than the ICL 2960 from preferential procurement. Coupled with the tight constraints on public expenditure, this policy is now stimulating the move away from ICL mainframes at some universities, although ICL at present is the only hardware company receiving any official "protection".

It is becoming increasingly urgent that sensible national policies are developed for the information technology industry. And such policies must go beyond anything that seems to be in the government pipeline at present, such as the support for the microelectronics industry (front page).

The policies should relate to a clear-sighted perception of the future and open-minded understanding of the technological and social realities of today.

Of course, these policies should include support for British industry and British manpower. But such support should include a strong bias to assisting those areas in which we have a worldwide lead, such as software and systems expertise, and to the stimulation of the advanced use of computers.

An inevitable by-product of this type of policy would be the growth of British-based manufacturing, support and service facilities by both British and "foreign" manufacturers.

Specific support for British-owned companies should be a part of the policy, either in the form of specifically funded projects or limited development contracts. Any attempt to provide a more protected home market, however, would be counter-productive.

Becoming a worldwide manufacturing company inevitably means establishing manufacturing and support centres outside the UK. ICL, for example, will only be taken seriously as a European company when it starts making systems on the other side of the channel. But would the British unions allow that?

For software companies, expansion now means growth outside Britain, and that growth inevitably means the export of British people, many of whom may never return.

That is why the document circulating at the Neddy manpower sub-committee criticising the "foreign" orientation of the British software business is so misconceived.

It is a fact of computing life that US-owned companies rule the hardware world. Even the Japanese and Communist countries are making IBM look-alikes.

Britain, however, could have a unique and powerful world role in software. It has the combination of high quality people and the right native language.

Unless Britain can provide an environment which promotes the growth and development of international software skills with sufficient financial incentive to encourage people to stay in Britain, the British computing industry will be heading for disaster – in both hardware and software.

Although Geoff Gross criticised production workers when he left the company, the future of the 2900 depends more on the success of the VME/B and K software rather than on the manufacturing capability.

There are already a large number of British software exiles throughout the world – people who say, "I would prefer to live in Britain but . . . ."

In terms of quantity, this number is small compared to the manufacturing workforce. In terms of importance, however, they represent the draining of our computing life force.

Ten years ago...

...COMPUTER WEEKLY NOVEMBER 30, 1967

PRIME Minister Harold Wilson claimed that the Labour government had saved the British computer industry from collapse out to the Americans, which would have happened, he declared, after "a few months of Tory rule" . . . Japan was lagging 10 years behind the US in the utilisation of computers, according to the Japan Productivity Centre . . . At the same time, the Sumitomo Bank was setting up a major online banking installation which would consist of nine NCR 315s, 6 CRAM units and over 1,000 terminals . . . Lack of suitable projects, rather than lack of money, was limiting the Advanced Computer Technology Projects scheme, said Wilson. The industry's lack of staff and money to support the project was also a problem.

FOCUS

On paying DP management

DATA processing management is among the best established when it comes to costing exercises. In fact the average DPM has few equals when it comes to whiling away the hours closeted with a desk calculator and sundry manufacturers' specification lists.

While other company managers relish their Pirelli calendars, the DPM prefers his dates unadulterated. The BASF graphics or Computer World Trade designs are deviation enough. When it comes to evaluating between display units or software packages, the DPM normally has more than sufficient statistics to hand.

It could, however, be that this dedication to DP facts and figures has unfortunate repercussions. While he may be well versed in negotiating financial leases, site insurance and operational budgets, he has overlooked his own fortunes. When it comes to organising his own pay, the DPM is in the also-ran class. Not only is he running a losing race with non DP management; he is even trailing in the DP field.

Recent highly relevant figures produced by the ever faithful and diligent Computer Users' Year Book should have made DPMs look up from their slide-rules. It did not take much reading between the lines to get the pay message. Salary increases over the past five years show that the average computer operator is top of the league, at 172%, and bottom of the table at 78% is the DP manager.

To emphasise the decline and near relegation of the DPM, CUYB points out that in 1972, a DPM on average earned over three times as much as a computer operator. This year he now receives twice the pay of an operator.

Given similar rate of deflation, the DPM now can confidently expect to be overtaken in the not too distant future by the rest of his team.

If this is the case – and the CUYB survey covered 1,200 installations involving over 22,000 employees – the DPM should be devoting some evaluation time to his own future, or perhaps apply for the next Honeywell operators training course.

Meanwhile, reports from the US suggest a very different pattern of pay. The average Weber salary survey for DP (until June this year) reports that while the average salary increase for installation managers was 5.4%, that for DP management soared to 11%. This way can all US DP managers be responsible for jumbo supercomputers. Maybe US company management is more enlightened than its UK counterpart.

Or maybe UK DP managers get what they deserve – much dedication to grass evaluation rather than to the challenge and joy of making a few decisions a day to keep up with the times.

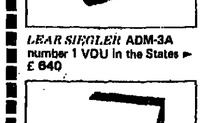
Peripherals at cash and carry prices

ANDERSON

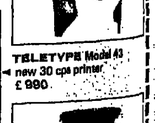
LA-36 DECwriter II
the 30 cps brand leader ►
£1090

TELETYPE Model 43
◄ new 30 cps printer
£990

LEAR SIEGLER ADM-3A
number 1 VDU in the States ►
£640



BCI Rotary Printer 1110A
◄ versatile 2,200 col/line
prints contents of VDU page
in 1 second
£745



Peripheral Hardware Limited
Domen Road, Yorktown Industrial Estate, Camberley
Telephone: (0276) 62717

RAIR TERMINALS
MODEL 3000 TAPE READER/PUNCH
*Full 30cps Punching and Reading
*Terminal and modem V24/20mA interfaces
*Compatible with all standard terminals
*Low cost
*High reliability
*Automatic Reader/Punch control
20 NOEL STREET LONDON W1V 8PG

PUNCHCARDS
All leading makes supplied. Delivered, guaranteed 24 hours. Lowest prices in U.K.
Direct Wholesale, 01-960 2658
Or write:
D.W. Limited
98 Wakeman Road, London, NW10

KNIGHT PROGRAMMING SUPPORT

THE ORIGINAL KNIGHT CONTRACT PROGRAMMING TEAM

Successful Software Support Specialists since 1970 in the UK and abroad

27 NOEL STREET, LONDON, W.1. 01-437 2164

INTERRUPT...

ONCE upon a time there was a university computing centre that ran a large number of Fortran jobs, mainly for the post-graduate students. The Fortran compiler was a nice friendly one that accepted the principle that the customer is always right.

For instance, if the user specified a numeric output field as 5 digits long, then 5 digits it would be — even if the data required 6 or 7 digits. In such a case, most significant digits were removed without any warning that this had been done, and the 5 least significant ones were printed. For instance, 916284 would be printed as 16284.

There came a terrible day when over a third of the users besieged the computer manager's office demanding to know why the output from programs that had been running perfectly satisfactorily for several months, or even years, was now bespattered with asterisks.

The answer was revealing. The compiler had been changed and the new one printed asterisks in place of over-long numbers. Many users were suddenly faced with horrifying proof that the programs analysing their research results, for which they hoped to obtain PhDs, were incorrect.

The moral: Be sure your logic is faultless; all that glitters is not gold.

● Submitted by G. W. Hart of Orpington, Kent, who wins the £5 interrupt prize.

Three-second X-ray scanner from EMI

A NEW computerised medical X-ray scanner is being introduced in the US this week by the world leader in the field, EMI. The new model 7000 uses a scanning technique different from the company's 5005 and 1010 scanners and reduces the scanning time from 20 to three seconds.

The 7000 was developed by EMI's US subsidiary, EMI Medical Inc. It is being shown to the medical world at the Radiological Society of North America exhibition in Chicago.

Like the 5005 general purpose body scanner and the 1010 brain scanner, the 7000 incorporates a Data General minicomputer. It costs $150,000 more than the earlier models.

At the same exhibition, EMI is introducing a radiotherapy system, the EMI-Six, also developed in the US. It incorporates a Digital Equipment PDP-8 minicomputer which accepts treatment parameters and monitors the treatment programme against those parameters.

Bearing in mind criticisms of hospitals which buy expensive scanners before their practical value has been fully proved, EMI is now promoting the idea of a shared scanning service, with self-contained scanning systems mounted on lorries and moving between hospitals.

EMI has received a £2.5 million order from Japan, its second biggest scanner market. The order, for 5005 and 1010 scanners, is from the company's Japanese distributor, Toshiba. EMI has now had 149 orders from Japan and over 500 from the US.

In total the company has received over 850 orders worth £180 million.

Laur Punter complaint 'test of CSA code'

PROCEEDINGS initiated by Laur Punter against fellow consultancy Wellorax under the Computing Services Association's code of conduct are continuing, despite the former company's liquidation (CW, November 24).

"By the book, Laur Punter has ceased to be a member of the CSA," said a CSA spokesman handling the case, "but we felt we ought to exhaust the lines of investigation which we had already started."

Apart from the merits of the particular case, the continuation would act as a test of CSA procedures.

"We want to see whether we should, in future, take a different line with complaints of this nature," he told Computer Weekly.

Laur Punter's complaint alleges unprofessional conduct by Wellorax over the failed merger negotiations between the two companies (CW, April 21).

The liquidation has not created any appreciable difficulty in proceeding with the complaint, said the spokesman. "We are talking to individuals, rather than companies."

£1m order for more postcode translators

FOUR postcode translators have now been delivered by Sperry Gyroscope for use in the Post Office's Mechanised Letter Offices, and the company has received a further £1 million contract for nine more.

The translator consists of a minicomputer and associated electronics linked to a Sperry magnetic drum on which is stored a dictionary of postcodes. The operator types in the postcode, this is checked against the drum dictionary and the appropriate code of phosper dots is printed on the letter. At the receiving mechanised office, a reverse process causes the letters to be sorted into delivery districts.

The translators are built by Sperry at Plymouth. The minis are Hewlett-Packard 21MX machines. For the next generation of sorting equipment, the Post Office is considering systems using micros rather than minis, and an alternative storage technology, likely to be solid state, rather than magnetic drums.

Micos APT to ease programming

AIMING to ease programming for its minicomputer-based Micos system (CW, July 21), MiniComputer Systems has brought to the UK a program generator which, it claims, will handle as much as 80 per cent of the programming of a typical business installation.

Known collectively as Application Programming Tools, the software comprises three modules handling data entry and validation, file management and report generation.

The APT programs require parameter entries describing, for example, validation criteria, file and report structures and the ways in which record fields are to be altered. The software then generates programs in MCS' Extensive Basic language.

File management includes matching of records from different files and changing of specified fields within records. Both sequential and indexed files are handled.

The report generation module, Request, has its own database-like view of the collection of files, allowing data for a report to be collated from several files without the end user being aware of their physical separation.

When the Basic programs have been generated, the user can amend them, either by editing the generated code or by inserting branches to separate user-written Basic modules. To assist with such tailoring, each part of the generated program is assigned a particular range of line numbers.

The user may tailor not only the generated programs, but the generator itself, which is also written in Basic. MCS supplies the specification for the system to ease such amendments.

For example, said an MCS spokesman, the standard package provides for 16 validation criteria for data entry and given the specification, the user can easily change the package.

APT is already being used by CAP in its work with the Micos system for the House of Fraser, and by MCS itself, notably in the set-up of its £1 million network of Micos machines for Shell.

NRDC's software policy

THE National Research Development Corp regards systems and software product development as an important field of technological innovation.

Speaking at a Computing Services Association lunch last week, NRDC managing director William Makinson said, "We are ready and willing to consider propositions from software companies." He emphasised that the NRDC would not take risks unilaterally but would demand a serious financial commitment from its partner in any joint venture. However, the corporation's financial participation could exceed 50%. This would depend on the product and the size of the company.

NRDC aimed to make a profit from all joint developments and could operate only if both sides were determined to make money. Market potential, he said, had to be clearly demonstrated and companies should not expect an easy ride.

Midland orders Arbat Swift system

A BREAKTHROUGH into the major league of UK clearing banks has been made by City-based systems house Arbat.

The Midland Bank has ordered the Arbat Swift interface system for its international division currently equipped with Burroughs' B7 SID.

The new system will run on twin Digital Equipment PDP-11/60 minis, each with 96K-words of store. The minis will be supplied by Arbat along with its own proprietary AIMS operating system and software.

The 11/60s will interface with Midland Bank International's two IBM 370/145 mainframes, using IBM 3270 terminal emulation.

A Midland spokesman told Computer Weekly that the Arbat systems would replace the B7 SIDs, and that it was chosen because it was available immediately.

Arbat, which has supplied Swift solutions for US banks including Security Pacific in New York and Chemical Bank at several European locations, believes that several major banks are looking for second generation high-capacity Swift access systems, and that the immediate availability of the Swift solution puts Arbat in a strong position.

Discounts offer for students

BUREAU time sharing services are being offered to secondary and higher education establishments at discount rates by the London bureau RTZ Computer Services. The company is offering Basic and Fortran for students learning programming, and two financial modelling systems, Financial Planning Simulator and Money and Profit Simulator.

Educational users do not have to pay a signing-on fee or a minimum charge. The discount rates will be available at off-peak times. These are before 10am, after 6pm, and at weekends.

The move into this market follows inquiries from colleges and universities as far away as Scotland. The service will be offered to universities, colleges and selected big comprehensive schools. It is seen as specially suitable for students and classes doing short term projects.

More power to Multics line

MORE details have emerged on the revamped Honeywell Level 68 Multics line, announced in the US last week and due in Europe next year.

The smallest of the four systems, the 68/DPS Level 1 is claimed to offer 25 per cent better performance than IBM's 3031, and a 15 per cent improvement on the former top Multics system, the 68/80. Level 2, 3 and 4 are 55 per cent, 285 per cent and 325 per cent respectively more powerful than Level 1 according to Honeywell.

Adding a second processor to Level 4 improves throughout a further 18 to 22 per cent, and adding a third gives a similar improvement over a two-processor system. No cycle times, benchmarks or memory access times were revealed at the US launch. A 68/80 can be field-upgraded to a 68/DPS.

It's just possible they haven't told you yet where to go for the best DP contracts

Job news travels fast. So someone's probably told you about Knight Computers and how good we are at finding short-term DP jobs for people like you.

But if you're still in the dark, we'll just tell you who we are, what we do, and where you'll find us.

We're the recruitment division of BOC Datasolve – the largest manufacturer – independent computer bureau in Europe. We find jobs for people, and people for jobs – programmers, operators and data prep. staff. Our clients range from blue-chip multi-nationals to small software houses; our own people all have DP backgrounds. So we won't just fix you up with a job, we'll take the time and trouble to find you the right job.

We're as near as your nearest phone. Call us, mention this ad, and whether you're in programming, operations or data prep.

Knight

Knight Computer Services Limited,
14 Old Park Lane, London W1Y 4NL.
Telephone: 01-491 4706.
Staff Services Division of BOC Datasolve Group and a member of Computing Services Association.

Datasolve Datasolve Datasolve

DOWNTIME

Computers of the Gods?

THE speculations of Erich von Däniken on one hand and our own "Liveware Saga" on the other may have led our readers to wonder whether ancient civilisations knew more about computing than we do. A Mexican civil engineer claims to have uncovered evidence that the Aztecs did have such knowledge.

David Esparza Hidalgo says that his search entailed a long period of associating with the local Indians, "gaining their confidence" (shades of Carlos Castaneda). Eventually an old Indian told him of a computing instrument called a "kipotl", the design of which had been passed down from the Aztecs.

The kipotl is evidently a smaller, simpler version of a full-size computer called a "nepohualtzintzin". Don't laugh, it's shorter than "three-seventy-one-five-eight".

Unfortunately, we have no details of what a "nepohualtzintzin" looked like. Our informant has, however, given us a brief description of a kipotl, from which it sounds not greatly different from an abacus of the Chinese pattern.

"Its biggest advantage", says Mr Esparza, "is that the person operating it has to reason." I know some programmers who would regard that as something of a disadvantage.

I began to be suspicious of Castaneda's Indian "guide" when he started sewing up lizards' eyelids to help Castaneda on his mystical drug experiences. I can't help feeling that the most ancient tradition of the South American Indians is called "pulling the leg of the foreigner".

Nevertheless, the Mexican Foreign Trade Institute has taken the "computers" at face value, and plans to export them. Watch out, IBM!

Pithy quiz-kids

OUR Champagne Competition at Compec, of which the winner was announced last week (CW, November 24), attracted a wide range of entries and some ingenious badge slogans.

Indeed, several competitors produced efforts which we felt deserved special runners-up awards — the first five win £2 for their slogans, and the sixth £3 for his original answers to the picture quiz.

Alan Ferguson, a technical consultant of Chingford, London, suggested, "HAL WAS ONE AHEAD OF IBM", which should please Arthur Clarke, and S. K. Collins, of Hayes, Middlesex, was pointedly brief: "I BYTE".

Frank Smith, a scientific officer of London, appealed "STOP IT – YOU'RE TICKLING MY BOOTSTRAPS", possibly, though I hope not, in response to the come-on from John Long, a senior programmer from Leicester: "LET'S GET OUR BITS TOGETHER!"

More gnomic was Keith Diment, a systems consultant from Wantage, Oxfordshire, who declared, "I'M HEXY. FIVE FIVES ARE NINETEEN."

Wrong, but prize-winning, answers to the picture quiz were submitted by S. F. Desmond, a systems analyst from Reading: (a) Uncompleted architect's model, Leaning Tower of Pisa (actually reels of mag tape); (b) University College Hospital, ophthalmic dissecting jig (operator's eye view of a disc pack); (c) Set of wooden exchequer tallies, c. 1830, HM Treasury (well, no; it was a microfiche), and (d) Debris after Grandmasters' draughts marathon (in fact it was chad from paper tape, cunningly disguised by printing the photo as a negative).

I think you all did very well.

Dial-a-spiel

FIRST the bad news. Considerable dismay has been expressed in the US over the operation of a new threat to civilisation as we know it, the robot telephone advertiser. This machine, once fed a list of telephone numbers, proceeds to dial all by itself, doggedly plodding through an entire exchange.

When someone answers its call, it delivers a taped advertising spiel, records any response, and hangs up. In what is described as a good day, it can notch up 1,000 calls.

After a Florida firm, Digital Products Corp, started selling the automatic dialler in June, the prospect of junk telephone calls adding to the pollution of junk mail proved too much for one recipient, a physicist called Walter Baer, who petitioned the Federal Communications Commission for relief. Then the White House Office of Telecommunications Policy, no less, urged the FCC to conduct a full inquiry into all phone advertising, and bills to restrict the new devices were introduced in the House and the Senate.

The good news? The last I heard, Digital Products Corp had sold only 45 diallers, and a rival company (also set up a few months ago) had managed to sell but one.

Well, I'm buffered . . .

IT'S an ill wind, they say, that blows nobody any good. Opportunist of the year award goes to one of the Xerox whizz-kids under Shel Klce who helped develop the highly regarded Xerox CP-V operating system. When Xerox pulled out of the business in 1975, he did a PhD at the University of California at Los Angeles.

His subject: how the Xerox closure affected the community of El Segundo. He now works for Systems Engineering Laboratories, the Fort Lauderdale, Florida-based high technology minimaker.

Public faith in computerised databanks is unlikely to be enhanced by the abuse of legitimate security needs to withhold information of general public concern, writes PATRICIA HEWITT of the National Council for Civil Liberties in "Computers and society: Electronic friend or foe", from which this extract is taken. Other contributors to the volume, which is to be published this month by Input Two-Nine, of Purley, Surrey, as part of the Current Aspects of Computer Technology series at £9.95, include Arthur C. Clarke, David Firnberg, Dr Chris Evans, Prof Iann Barron and other leading figures in the industry, and is edited by Alan Simpson.

Danger of the secret invasion of privacy

"POWER may come out of the barrel of a gun, but far more power comes out of a computer or databank, particularly if the information in it relates to people who do not know that it has been collected or cannot challenge its accuracy or use."[1]

The flourishing personal information industry is an essential part of complex social structures. A credit-based economy needs credit reference agencies. The personal social services system — under increasing pressure to prevent family tragedies — accumulates more and more information about its "clients" and tries to devise exhaustive procedures for sharing its data with all the other caring and legal services.

Informal notes collected by teachers have been replaced by standard assessment cards. The financial support system — social security, supplementary benefits, family income supplement, child benefits and a host of local means-tested benefits — cannot function without millions of files, often duplicating each other.

But the process of collecting information in order to allocate services is not a neutral one. The agencies which use personal information exercise control over people's lives — from, at one end of the scale, a decision to refuse hire purchase to, at the other end, a decision to take a child into care, withdraw benefit or refuse someone a job. And the information used as the basis for the decision — which may be inaccurate or irrelevant or involve questionable judgments — will be kept confidential from the one person who is most affected by it.

In a society where privacy is increasingly rare, and people often feel at the mercy of agencies which they cannot challenge, information privacy — the control of personal information about oneself — is crucial. Since 1968, when NCCL published *Privacy Under Attack* as part of our contribution to Human Rights Year, we have been concerned about four key aspects of the information business:

- the way in which personal information is collected;
- the use of inaccurate, out of date or irrelevant information or opinions as the basis for decisions;
- inadequate security to ensure that confidential information is kept confidential; and
- the transfer of information given for one purpose without the individual's consent.[2]

English law, both civil and criminal, is grossly inadequate to cope with these concerns. To take one example, Tracing Services Ltd, the credit reference agency whose employees impersonated police officers, tax inspectors and DHSS officials in order to obtain personal information, was convicted in 1969 of conspiracy to effect a public mischief. The offence no longer exists (thanks to the House of Lords' decision in a case involving bugging devices), but nothing has been put in its place. In the absence of a general right of privacy, most people have no redress against invasions of their privacy.

Not only is existing law inadequate, but the government's own strategy of legislating for computerised databanks, via a Data Protection Authority, is tangential to the real problems. As NCCL has consistently stressed, it is not computerisation which invades privacy: the four factors noted above apply equally to manilla files, index cards or microfiche systems, as well as to computerised databanks.

Certainly, computerisation changes the scale of the problem, by making it possible to collect, store and combine information in quantities and ways that are impossible with a filing cabinet or card index box. Computerisation may also involve different, practical problems, particularly when it comes to security.

For instance, a debt-collecting subsidiary of Diners Club Inc in the US has been prosecuted for allegedly tapping computerised credit-reporting databanks; in another US case, the Factual Service Bureau allegedly obtained personal information illegally from the FBI's National Crime Information Centre, the Social Security Administration and the Internal Revenue.

Where the original information in, for instance, a school record or credit reference file is inaccurate, based on hearsay or gossip, or irrelevant to the purposes of the databank user, then it will not be improved by computerisation. But neither will it be made more harmful — unless, of course, the failure of the security procedures makes it available to thousands of new users.

There is also a new danger in relying on the coding of subjective judgments which may be involved in mechanisation or computerisation: a note scribbled by a Department of Employment official on an unemployed worker's file is a different matter from an "A to D" coding as to employability, which was proposed by the Manpower Services Commission for a computerised experiment on London unemployed workers.

Because the government has decided to legislate only for computers, the Data Protection Committee has been looking for evidence, in the form of individual cases, of abuses of computerised data. They have, apparently only found one, in a government databank, and that with some difficulty.

This is hardly surprising. NCCL receives many hundreds of complaints about information privacy every year. But people only complain when they can find out (often by accident) what is being done with information held on them. And the databanks which seem to cause most concern are those which are not computerised, and where people are most likely to make the link between the information and an adverse decision — credit reference files; school records; personnel files (where a black mark against an employee may only come to light in the form of a reference); supplementary benefits and social security records held locally.

The most disturbing example of the link between invasions of individual privacy and government secrecy is to be found in police and national security information-gathering. Scotland Yard's Criminal Intelligence section (which deals with associates and suspects, as well as those with criminal records); Special Branch, responsible for political investigations; and the Security Services carry out surveillance operations and maintain records on millions of people.

But the public are not told how many people are involved; what kind of information is collected or how (estimates of the number of phone-taps each year range from a few hundred to 12,000); and what criteria are used to decide on someone's exclusion in political records.

Scotland Yard has recently awarded a contract for the computerisation of all its records, which it is estimated will "belong" to the Special Branch. But all further information — the total numbers involved; confirmation or denial about the extent of Special Branch records; which sections of the police force or what other agencies, will have access to the information — is refused on grounds of "security."

Public faith in computerised databanks is unlikely to be enhanced by the abuse of legitimate security needs to withhold information of general public concern.

As the US has shown in information-gathering by the police and security services, one of the most sensitive points at stake; and as the country has shown too, not even the police and security services should be immune from legislative controls designed to protect individual privacy.

REFERENCES

1. John Shattuck, Privacy and Control, Privacy Report Vol. No. 8, March 1976 (American Liberties Union).
2. See Privacy: The Information Gatherers (NCCL, 1977) for detailed proposals for legislation and administrative action.

ACOUSTIC COUPLERS

Contact
MOORE REED & CO. LTD.
Walworth, Andover Hants
Tel Andover 4151b

STOP WASTING MONEY
MicroSim 8080
The world's most advanced Program development system
ALLEN COMPUTER SERVICES LTD
01-405 1565 Victoria St. Slough Bucks SL1 1QE

RENTING YOUR IBM 370?

Thanks to IBM's new rental/purchase conversion scheme

SCL can offer

SHORT-TERM LEASES ON RENTAL CREDIT MACHINES

For further information call:

Standard Chartered Leasing Company Ltd.

A member of Standard Chartered Bank Group

Standard House
27 Northumberland Avenue
London WC2N 5AG
Telephone: 01-839 3303
Telex 918094

Rising star of hobby market goes on sale in UK

ONE of the potential "stars" of the personal and small business computer business, Apple II, is now being sold in the UK by its newly-appointed official distributor, Personal Computers.

This is a new company in which commodities analysts Rolf and Nolan, has a financial stake, while an ex-employee, Mike Sterland, heads the operation..

Apple, says Sterland, is to be Personal Computers' sole product line for at least a year. He is avoiding rapid diversification to allow himself to concentrate on marketing the machine.

Although the first sales have already been made, deliveries are being held up by the need for an interface card suitable for operation with PAL colour TVs. This is currently undergoing tests at the main European distributors, Eurapple in Holland.

Based on the MOS Technology 6502 processor, Apple II is a fully assembled unit that can be equipped with memory ranging from 4K to 48K bytes, and with a price range of £995 to £1,900. It requires the addition of a cassette tape recorder and television for operation, and it can be directly interfaced with a colour television. A full ASCII keyboard is built into the unit.

Colour graphics are included as a standard item in Apple, and the software includes a 2K byte, ROM mounted monitor and a 6K byte ROM mounted Basic. As an option, there is also an expanded, floating point Basic known as Appiesoft.

First user reponse to the VAX-11/780

FIRST reactions from Digital Equipment users to the new 32-bit VAX-11/780 suggest that it will be a bold systems builder who decides to pioneer usage of the powerful mini.

"In native mode it looks like a real number-crunching winner." Doug Schilling of Arbat commented. "But how do you get your code into it? It seems that only people running under RSX-11 on their PDP-11 machines and writing in Fortran can migrate their software easily.

"At first sight it appears that Macro-11 code written to run under RSX is all right until you read the small print. Then you find that privileged instructions are not allowed, which means that rewriting will be required."

The VAX-11/780 allows PDP-11 software to be run in emulation mode, but its equivalent power is then only that of the less expensive PDP-11/70, so in most cases little will be gained by so doing.

"I think DEC introduced it mainly because it has been missing out in the aircraft simulator market recently for want of a 32-bit machine, losing potential business to people like SEL," said Schilling.

Arbat builds systems for the banking and financial market based on PDP-11 hardware and its own proprietary AIMS operating system and programming language.

"We are assessing the cost of rewriting AIMS to run on the VAX," said Schilling. "It would take us about six months, but we would end up with a machine which runs 2.5 times as fast as the PDP-11/70 at about 1.5 times the cost."

Dr George Coggan, managing director of Gamma Associates, was enthusiastic about the product in principle.

"It's an exciting product, and we see it extending the range rather than replacing the PDP-11/70.

"The first organisation to order a VAX will be a pioneer, and Gamma would have to evaluate it very carefully before making a decision to buy. But DEC is now the second largest computer manufacturer in the world, and we are happy to see them developing new products at both ends of the line," he said.

Gamma has a PDP-11/70 and two 11/45s, and offers bureau services as well as installing commercial turnkey systems on PDP-11s, mainly running under RSTS.

The lack of an emulation facility for programs written to run under RSTS, apart from those written in Basic Plus 2, has led some people to assume that RSX is the shape of things to come in DEC operating systems and that RSTS will not be enhanced although continuing to be supported.

Geoff Finch, DEC's Northern European OEM marketing manager told Computer Weekly that nothing of the kind had ever been said.

"It is wrong to conclude that we will not continue to enhance RSTS. The two operating systems are designed to solve different problems. RSTS is a time sharing operating system, whereas RSX is a real time operating system.

"In theory, it is possible to write an application migration executive which allowed RSTS to run under VMS: we simply have not done so," he explained.

"VMS will do the same thing as RSTS: it represents a single operating system in which we have attempted to optimise the features of both RSTS and RSX."

The price-performance characteristics of the VAX-11/780 have also led people to conclude that it virtually knocks the medium scale DECsystem-20 36-bit mainframe out of the market, but again Finch denies this.

"VAX is just not the same product as the 20 at present. In two years' time it might be, but today, if a customer's requirements are likely to grow he will be steered to the DECsystem-20. The VAX is not suitable for the end-user in a commercial environment; for example, there is as yet no native mode Cobol on it, so we need the 20 for that market."

Doug Schilling . . . "How do you get your code into it."

CSC upgrades 17 mainframes to 1100/80s from 1979

THE key role that the 1100/80 performs in Univac's marketing strategy is underlined by the fact that Computer Sciences Corp has decided to upgrade all 17 of its 1108 mainframes to 1100/80s, starting in 1979.

The 1108s are used on CSC's international Infonet time sharing service and are installed in three data centres in the US, and in Canada, Australia, South Africa and Spain. In the latter three countries, Infonet operates through affiliated or licensed companies.

The 1108s run under CSC's own CSTS operating system, but the broad compatibility between the 1108 and the 1100/80 means that CSTS should run on the new machines with very little software conversion.

The first 1100/80 is to be delivered to CSC next March and will be used for research and development. Two possible upgrades for the 1108, the 1100 and the 1100/40 were introduced by Univac before the 1100/80 was announced late last year.

Prime order

TWO companies in Basildon, Essex, have jointly ordered a Prime 400 minicomputer to handle their own processing and to provide bureau services. They are Systematics International, which provides market research information to manufacturers of construction and agricultural equipment, and Distributed Data Processing, which serves scientific and engineering users.

VDU DESKS

L-shaped right or left-hand, genuine formica worktop. Flat or well. Courtesy Panel, Rigid Tubular frame work.

£99 Quantity Discounts available

Write or telephone:
D. N. Computer Services Ltd.,
St. Martins St., Rochdale.
Tel. Rochdale (0706) 54711

Sharp fall in public service business

A SIZEABLE drop in the value of billings to public service clients in the second quarter of this year is shown in the last Business Monitor on the UK computer services industry, from the government's Business Statistics Office.

Total billings by UK computer service companies in the second quarter, at nearly £64 million, were about £1.5 million up on the first quarter of 1977 and more than £9 million, or 17%, up on the second quarter of 1976.

Most of this growth was accounted for by a healthy expansion on the private sector, where billings came to more than £34 million in the second quarter of this year, compared with £31 million in the first quarter, and well under £28 million in the second quarter of 1976.

Business with the public sector fell from nearly £9 million to £7.5 million between the first and second quarters of this year, although the Statistics Office points out that the first quarter level was unusually high.

However, the second quarter figure was no higher than that for the seond quarter of 1976, indicating an actual reduction in public sector business over the 12 month period if inflation is taken into account.

In contrast, business with overseas clients increased by well over 30% during the same period, the total value of billings rising from £2.4 million to more than £3.1 million. But this rapid growth was checked between the first and second quarters of this year during which overseas business hardly increased.

Citibank $2m order to NCR

COMPUTER equipment from NCR worth $2 million has been installed by Citibank in New York, to help in reducing office processing costs and to improve customer service.

The equipment consists of twin NCR Criterion 8550 system using the NCR Central Information File system, 17 NCR 7750 distributive document processing systems and VDUs.

The distributive systems, located in Albany, Buffalo, and Rochester, are linked online to the 8550s housed in Rochester.

Exciting things happen with Prime Computer

With 24 hour working and 20 tons of rock removed with every shovelful, Taylor Woodrow need their Prime computer to optimise open cast excavation – profitably. If your business has requirements as diverse as structural analysis, vehicle route planning and financial project control, Prime has a computer in its range to suit.

Prime Computer (UK) Limited, The Merion Centre, St Peter's Street, Bedford MK40 2PN and The Coach House, 173 Sheen Lane, London SW14 8NA. Telephone Bedford 0234 65121 or London 01-878 4045.

PRIME

GILB'S MYTHODOLOGY

Numeric input codes: are they cheaper than alpha?

THERE is a widespread myth in the data processing business that numeric codes for almost everything are somehow to be preferred.

The mythodology of the numeric code has been with us so long, and is so deeply ingrained, that I have seen large car-factory DP installations with hundreds of input document types, and not a single alphabetic code was in use.

I have had serious debates with clients who wanted to put in pure numeric online terminals instead of allowing for the possibility of alphanumerics. One of these capitulated when I could demonstrate that the time-pressured online registration was faster and safer using a few alphabetic concepts.

The starting point of this myth is the observation that numeric keying in data registration "is faster". And the belief that the introduction of alphabetic codes in the keypunch room would require 180 instead of the present staff of 60 pretty young things.

I have a table of objectively measured keying rates for different types of material on different types of machines (reproduced in Software Metrics*, P.213).

The table provides some food for thought because it clearly shows that almost all forms of alphabetic keying have a raw keying rate two to four times as fast as any of the pure numeric keying rates.

The answer to why this is so is not very far off. The highest keying rates (about 750 keystrokes per minute) are achieved by competition typists, typing a page of text on an electric typewriter.

The typists are well trained and practised in their art. Your keypunch girls are probably not very good at touch typing alphabetic data and they use ten fingers as opposed to keypunchers' five. The words are meaningful to them — as are the sentences — so they can make use of their human buffer memory to speed up the output. It doesn't seem at all unreasonable that our keypunch girl is only working at 200 to 400 characters a minute.

There are no clear grounds for assuming that codes which are designed as numeric codes will result in greater human productivity.

There is even less reason to prefer numeric codes when we consider the extra work of finding the correct code, and filling in a form (MAR becomes 02, SMITHS becomes 023456-8).

The work of finding unique codes for naturally occurring data is excellently suited for a computer program, and programmers who force people to do such demeaning work are committing heresy. The programmer who insists on a numeric code series because it seems to simplify his program subscript usage, has got his priorities all wrong and needs help or another occupation. Unfortunately they really exist, today.

Even if we, for the sake of argument, assume that numerics and alphabetics are roughly the same in keying rate, we should recognise the superior properties of alphabetics for allowing the use of more natural codes, for allowing automatic detection of random errors, for allowing automatic correction of chance errors, and for allowing for growth and change in the code series.

For example, if we assume that numerics allow 10 combinations of characters and that alphanumerics allow 40, then we can immediately see the potential advantage which alphanumeric codes give of allowing us to write and key *fewer* characters for a data element. A four character code has about 2,560,000 combinations (which would require a seven digit number).

Let us look at the error detecting properties of a four digit code (0000-9999) if all 10,000 combinations are utilised. Any random error is a valid code and the probability of detecting an error based on discovering an invalid or unused code is obviously 0%.

If the code had been designed as alphanumeric (000 to ZZZ, plus national special characters or signs) there would be 249 invalid combinations for each valid combination. A chance corruption of writing or key depression would have a 249/250 or 99.6% chance of resulting in an invalid code. Thus it would be detected without doing any harm, even with the most primitive control of table or file lookup.

If we should increase the number of objects which the code relates to by say 200% (30,000 customers or products now, for example) then with the pure numeric code we would require an extra digit (25% extra keying effort), whereas if we were satisfied with a small reduction in error detection ability for chance errors (from 99.6% down to 247/250 or 98.8%) we could keep the same number of characters in the code.

Numbers have their place, wherever numbers are natural to use, such as in amounts, quantities and day of the month. But other types of codes have significant advantages, too.

My hypothesis: "Systematic utilisation of alphanumeric codes results in data collection productivity improvements of at least a factor of two to four."

*Student Literature, Oslo. Input Two-Nine Ltd. 7 Banstead Road, Purley, Surrey CR2 3ER. £8.50.

More

capacity with OPTIMIZER II

OPTIMIZER II automatically eliminates object code wherever possible, in every path and loop of the program - saving time and space for IBM 360-370 COBOL programs operating under OS, OS/VS.

Average CPU execution span is improved by 10 percent and sometimes more! Typically, OPTIMIZER II expels some 35% of object code - saving approximately 20% memory, reducing Paging Rate, increasing throughput and therefore system capacity. Hard facts proven by over 500 satisfied organizations, worldwide, as shown by the inclusion in 1976 DATAPRO Software Honor Roll, for the third consecutive year.

OPTIMIZER II uses techniques inaccessible to your... Programmer and COBOL Compiler to trim the unnecessary fat which accumulates whatever IBM OS, OS/VS System and Compiler is used, however efficient the program.

Get yourself some more capacity without Source Program, Compiler, or system changes of any kind - call for full facts and actual case histories:

LONDON TEL.: 01/487 5681

STOCKHOLM TEL.: 08/88 0125

GEMINI COMPUTER SYSTEMS Ltd.
84, Baker Street, London W1M 1DL (Great Britain) Tlx.: 22538
BRA,
Bredängstorget, 1, 127 32 Stockholm (Sweden) Tlx.: 11572

CGS Products — MEMBER OF THE GAP Gemini SOGETI GROUP — More OUTPUT from your INPUT

SOFTWARE HI

US report calls for more investment in development tools

A REPORT produced by the US National Bureau of Standards* takes the view that investment in program development tools by the average computer installation is inadequate, and should take a higher priority in budgets and work schedules.

The document surveys the available software tools in various categories, uncovering a surprisingly narrow specialisation in the functions of such aids.

It goes on to recommend a strategy for the in-house development of programming aids, the chief feature being design of multi-function aids from standard "building blocks", stored on a library.

Knowledge of the techniques of analysing program text and its syntax and collating symbol tables for identifier names in a particular language will, the report claims, equip a user with the ability to build his own program development tools.

As an experiment, a package was constructed to combine editing and syntax checking, so that a user could check immediately that a proposed amendment to a program was syntactically "clean". The syntax checking portion was not developed by the NBS, but obtained from the UK's National Physical Laboratory.

The linking of the "building blocks" for this product brought out a number of problems, the principal one being the conversion of a stand-alone program to a linked subroutine.

Consequently, the report recommends developing the "building blocks" as subroutines from the beginning, even at the cost of programming a dummy "test harness" to run them.

A need was also identified for improved linkages between modules originally written in different languages and a facility for declaring data to be shared by a few modules — something between "local" and "global" data.

The experiment also led to some interesting ideas for future consideration. These include an editor which will correct trivial syntax errors, and one which points out errors as they are entered. At least one product of the latter type has already been devised.

Extrapolating such multi-function aids further, says the report, the compiler could, in future, be "left largely with the task of code generation".

The NBS report also includes voluminous references to previous articles on the subject and statistics on the existing use of program development aids.

This uncovers the surprising fact that most tools were acquired with the hardware from user groups, or developed in-house. This "suggests a weak market for tools from the vendor dependent software companies".

* Software Tools: a Building Block Approach; National Bureau of Standards, $2.10 + 25% for mailing outside US; available from the Government Printing Office, Washington DC 20402.

Interfacing RTL/2 is main theme of user meeting

A MEETING of the RTL/2 group is scheduled for December 6 and 7, at the Excelsior Hotel, Heathrow. Topics of discussion are planned to include user evaluations of the language, applications experience, developments in software support and proposals for compiler programming standards.

Apart from routine maintenance, an important topic will be the support heading will be interface with operating systems and other machine-specific software. RTL/2 was conceived as a portable language, said a spokesman for marketing agents SPL, but a compromise had to be reached at the right level, to enable users to take advantage of some of the exceptional operating system facilities.

Puzzler

A THREE figure number ABC has only one divisor DE (other than itself and unity). Given that one of the five digits involved is 4, can you identify them? Turning to page 47 for the solution?

Gilb answers the critics

"FIRST an apology for a tardy reply to the many readers who have commented on some of the Mythodology columns and the associated letters, so I will not attempt too detailed a comment.

Roger Tagg (Letters, October 13) was not so convinced by my attempts (September 8) to shoot down DBMS, and Jeremy Salter of Norsk Data had similar problems on behalf of his Codasyl based (Fortran based too) minicomputer DBMS (CW, October 20).

I hope that my further efforts to give far more specific and quantitative evidence and references (October 6) were more convincing. Certainly Mr Tagg did not have the benefit of reading it before he wrote.

Both parties were admittedly sales agents for their own products IDMS (Tagg) and SIBAS (Salter). I don't doubt their cases as stated, and certainly I have no specific accusations for these particular products.

I am sure they work, and that they work better than most of the other packages on the market; certainly better than the top-heavy products I was specifically referring to in my column.

Neither of the correspondents offered, or even indicated the existence of, evidence of the relative profitability of using their packages compared to simple file organisation techniques. The more facts the better.

My main thrust is simply to make it apparent that we all need to ask harder questions and get harder guarantees when considering the use of a DBMS.

I rest my case on the evidence presented in my columns — but for those who want to debate more, I will be presenting a special one-day session for Infotech in February in London.

Contrary to Mr Salter's assertion, California is my home country, although Oslo is my place of residence. I was busy all October being a prophet of my own country. So he needn't worry on that score.

Further, I would like to deny the headline implication that I am in any way anti-mini. I am an attack on large centralised systems.

EDITED BY STEPHEN BELL

Infonet gets database enhancement

THE Infonet time sharing network operated by Computer Sciences Corp has been enhanced with the addition of a new database management system, Manage, which uses a Codasyl-type data definition language.

Building on this foundation, the system provides three data access and manipulation facilities: a programmer interface (from Cobol, Fortran, and Assembler); a custom-built interpretative language; and a report generator.

Manage is fully compatible with the previous data management system, Aladin. It can be used as a structural manager for users' existing Aladin files. Thus, by using the report generator facility, non-technical users can rapidly and easily extract and assemble information from computer files previously unavailable to them. Manage is now the most powerful data management system available on the Infonet network.

Graphics interface

FOLLOWING its release of the Turned Parts Cost Estimation package (CW, November 10), the CAD Centre, Cambridge, has, as promised, produced a similar graphics interface for generating numerical control tapes for machine tools.

The package displays a picture of the original component and, as machining operations, are defined to the NC routine, these are reflected in changes to the picture. The package has been developed at the Centre's production services department.

More micros in IBM ops systems?

SOME likely developments in IBM operating systems and their usage patterns have emerged from a meeting last week of a sub-group of the IBM user group, Guide. Most significantly, more ammunition was given to the expectation of increased microprogramming on the periphery of the operating systems.

The meeting, of the DOS project group of Guide in the UK, took place in Worthing, Sussex and attracted about 50 DOS and DOS/VS users.

In response to delegates' questions, John Wright, from IBM's Large Systems Group at Chiswick, indicated that file access methods could, in future, be microprogrammed within separate I/O processors or intelligent disc controllers, both speeding execution and taking the load off the main processor.

There has been a growing feeling among users that such microprogramming is on the way. Already there are microprogrammed "assists" for the latest 370s making the hardware more amendable to the required operating system.

Sorting and other utility software, users feel, is also an area which IBM could be viewing as ripe for microprogramming. Suppliers of independent utility software have already expressed fears of such a trend, pointing out that ready-made microprograms would severely handicap sales of their products (CW, May 5).

There are snags to the microprogramming of systems software, Wright admitted. One of the primary difficulties with the disc access methods would be "stabilising the specification", since alterations would be more difficult to implement than with pure software.

Wright's chief topic, however, was the 3031 processor. In his presentation, he gave particular emphasis to MVS.

Taking into account the target market of the 3030 range, and adding price-performance influences on movement within the 370 range, a large increase can be expected in installations moving directly from DOS/VS to MVS, the meeting felt.

A report was given of Guide sub-group meeting earlier this month in Mainz, West Germany. There, IBM gave strong hints that DOS/VS would be supported into the foreseeable future, and some observers saw OS/VS1 disappearing first.

The user community would then split into DOS/VS users at the small end of the range, and MVS on the 158 and upwards, with an increasing proportion of VM/370 users, mostly those with a time sharing requirement.

The UK Guide meeting was also addressed by Anthony Hemens, from British Home Stores, who spoke on the growing number of disc-space management aids available for IBM users and gave his experience of one.

John Gray, of Lombard North Central, gave an account of benchmarks on IBM's new DOS/VS link editor, which substantiated the company's claim for a large improvement in link edit time.

Zeus-Hermes' move into applications pack soon

THE first applications packages from software house Zeus-Hermes could shortly make their appearance as a result of work done for specific clients. The market for two pieces of software as generally available products is at present being assessed, said director Mick Punter.

Both systems are based on Zeus-Hermes' ICL teleprocessing monitor Cortez, and were developed for Racal and the Yeast and Food division of the Distillers Company.

The Distillers Company software aids the often difficult task of reconciling cash received from a customer with several outstanding invoices.

Using an ICL 2903-based TP system, a clerk can "pull" selected invoices from an account, while the outstanding cash is displayed. The clerk can pull different invoices until this balance reaches zero.

The software developed for Racal handles stock and production control, and will be implemented on two ICL 2904s, with an attached network of terminals.

Look monitor enhanced

AIMING to provide the user of IBM's MVS operating system with better aids to tuning the software, Applied Data Research, of New Jersey, has added facilities to its Look performance monitor.

The main additions are two commands providing information on the functioning of MVS' System Resource Manager and Auxiliary Storage Monitor. Commands have also been added to control the functioning of the SRM.

Look also applies to other OS and OS/VS environments and is marketed in the UK by CAP.

PROGRAMMER NOTES

Have the new methods squeezed out creativity?

ANOTHER US commentator has entered the opposition lobby on "modern" programming standards. Sociologist Philip Kraft claims that structured and modular programming and the "chief programmer team" concept has been used by management to "de-skill and control their programmers."

Kraft agrees that the techniques have achieved their aim in making the programming task easier and more standardised, and dividing up larger tasks, but questions whether such simplification is necessarily a benefit.

"Barely a generation after its inception, programming is no longer the complex work of creative and even eccentric people. Instead, divided and routinised, it has become mass production work parcelled out to interchangeable detail workers."

This change, he says, has been dictated by management, whose aim is not to make the job more interesting, but to reduce costs and increase profits.

Long-term programmers among our readers must have had experience of the pioneering days of programming which Kraft admires. Have things changed all that much? Are programmers still creative, or are they interchangeable units? Are the new "units" the same people with the creativity squeezed out of them, or a different set of programmers with entirely different personalities?

Even if we grant Kraft's thesis, it could be argued that management is right; it is a programmer's job to be productive and make money for the company, rather than to enjoy the job.

While on the subject of structured programming, we should quote a London reader, who queries whether the GOTO is completely redundant, as suggested by Ivor Danicic (CW, November 10) and many others.

Frank House, of Guy's Hospital Medical School, appends a fragment of coding whose function is simply to read an input and direct a user to an appropriate part of the program.

He suggests:

Try again: writetext ('I to input new data, 2 to input new starting point, 3 to resume, 0 to stop')

```
if d = 1 then goto fresh data;
if d = 2 then goto start point;
if d = 3 then goto carry on;
if d ≠ 0 then begin newline
(1): writext ('clot') goto
try again
end;
```

"This seems to me a natural and self-documenting way of writing the program," says House, "and, yes, I have heard of *switch*, but I find that less self-explanatory, when I return to a listing after a year or so, and *else if* uses more ink. Is there a better way of writing this which avoids *goto*?"

Read What Users Say About...

CA-DYNAM/D

...the most complete system currently available for Disk Space/Catalog Management on DOS, DOS/VS 360/370 computers

Announced in April 1977, CA-DYNAM/D already has over 100 users. The benefits mentioned below explain this quick initial growth. Here's what our users say:

– *"DYNAM/D gave us the extra capacity to run an extra partition with no conversion costs"...*

– *"We were planning to upgrade to OS/VS ... DYNAM/D has enabled us to remain with DOS/VS"...*

– *"DYNAM/D has given me an extra disk drive"...*

– *"My current disk space utilisation has decreased by one third, using DYNAM/D"...*

Release 1.1 announced recently adds even more features:

- disk pool management for better balance of disk space usage and greater security –
- BACKUP-RESTORE which allows saving any disk file onto tape and then restoring the file from tape to disk –
- Dynamic LUB facility (DOS/VS only) which enables users to specify SYS number entries when CA-DYNAM/D changes assignments –
- CA-SORT – CA-DYNAM/D interface which releases unused space as soon as Phase 1 of Sort is completed.

If you're a DOS or DOS/VS user yearning for some of those privileged OS features, you're invited to evaluate CA-DYNAM/D for 15 days... entirely without obligation.

See how soon it starts saving disk space, and improving throughput in your centre. Just send us the coupon for prompt action. Or better still – call us now.

☐ Please call me, I'm interested in knowing more about CA-DYNAM/D.
Name
Title
Company
Address
City
Telephone (area code)
Computer
System

COMPUTER ASSOCIATES

David Tofy,
Computer Associates (U.K.) Ltd.,
Park House,
Park Street,
Maidenhead, Berks.
Tel.: (0628) 30616

market place

Contact Stuart Moore

For Advertising Rates PHONE 01-261 8757

ONE BOTTLE OF WHISKY

from 2 boxes of Punch Cards.

Why not finance your Xmas Party by selling your scrap computer listings and punch cards to:

Leyton Waste Paper
Tel: MIKE BOWLES
on 01-558 2731

FOR SALE

2 MDS 6403
1 MDS 6401
1 Univac Printer
DCT2000

OFFERS TO:
BRIAN PUGH
0223 465200
Ext. 270

Wheatsheaf Computer Centre
Charter Avenue
Coventry

DEC.11/04's & /34's

SYSTEK LTD. 46 Fitzroy Street 01-388 7828
London W1P 5HS 01-636 3025

COMPUTERS—PERIPHERALS ETC.

IN — OUT

WE BUY — WE SELL
HARD CASH — COMMISSIONS

Scopes, Test Gear Anything considered

Phone: READING (0734) 586419
7/9 Arther Road, Reading

tectonics guarantees

12 MONTHS FREE SUPPORT

on all development projects, from one-off programs to major systems

contact Terence Salmon QBP Ltd
Tectonics Ltd 54 Tintagel Rd Orpington Kent
The fixed price fixed time specialist

ELECTRONIC BROKERS LTD

MINI COMPUTERS AND PERIPHERALS

LARGE NEW STOCKS OF DEC PDP MINIS!

PDP 8E PROCESSORS, 4K TO 32K VARIOUS CONFIGURATIONS AVAILABLE PRICES FROM £2800
PDP11-05 PROCESSOR, 8K & 16K PRICES FROM £2250
PDP11/40 PROCESSOR, 28K CORE £8250
PR11 HIGH SPEED READER & COMPLETE WITH INTERFACE £1750
RK05/RK08 DISK DRIVE AND CONTROL £3800
RK08-10 SECTOR DISK PACKS £30.00

MM8E 4k Memory Stack	£600
MM8EJ 8K Memory Stack	£1300
MC8EJ 8K Memory Extension	£1000
MM11-E 8K Memory Stack	£1000
MP11-E 8K Memory and Backplane	£1500

WE BUY — WE SELL

TERMINALS

SPECIAL PURCHASE OF TEXAS SILENT 700 PORTABLE TERMINALS TYPE 733 COMPLETE WITH BUILT IN ACOUSTIC COUPLER AND CARRYING CASE SWITCHABLE TRANSMISSION SPEED 110 150 300 BAUD PRICE £595.00
HAZELTINE TELETYPE COMPATIBLE VISUAL DISPLAY UNITS SWITCH SELECTABLE TRANSMISSION SPEEDS UP TO 9600 BAUD FULL/HALF DUPLEX V.24 INTERFACE
H 1000 1000 display characters PRICE £498.00
H1200 1920 display characters PRICE £720.00
H 2000S 1 2000 display characters plus full edit facilities, batch mode dual density diskette and tape backup dual PRICE £995.00
ASR33 AND KSR 33 TELETYPE TERMINALS, CURRENT LOOP OR MODEM INTERFACE PRICES FROM £425 (KSR) AND £675 (ASR)

ALL UNITS FULLY REFURBISHED AND SOLD WITH 90-DAY WARRANTY

ALL PRICES SUBJECT TO CARRIAGE AND VAT

ELECTRONIC BROKERS LTD. (Computer Sales & Services Division)
49-53 Pancras Road, London NW1 2QB Tel: 01-837 7701
TELEX: 298694

WEBSTER D/P SERVICES LTD.

FOR USED DP EQUIPMENT
BUY OR SELL THROUGH 01-464 9011

NEW DE LUXE 80 COLUMN PUNCHES

WDP
01-464 9011

WEBSTER D/P SERVICES LTD.
65 WIDMORE ROAD, BROMLEY
KENT BR1 3AA

CoOperators supply first-rate contract operations staff for long or short term needs -FAST
RING NOW 01 836 8411

OPERATORS

CONTRACT AND PERMANENT

FOR A PROMPT SERVICE
PHONE 01-439 6481 NOW

and speak to a top professional in an established company

(24-HOUR ANSWERING SERVICE)

EFFECTIA GRAVIS

Licence No. 851(A)52

EFFECTIA GRAVIS
Personnel Consultants
National House
68 Wardour Street
01-439 6481
LONDON W1V 3HP

reprints

If you are interested in a particular article/special Feature or advertisement published in this issue of

COMPUTER WEEKLY

why not take advantage of our reprint service. Reprints can be secured at reasonable cost to your own specifications providing an attractive and valuable addition to your promotional material. *Minimum order 250.*

For further details contact:
Brian Durrant, IPC Electrical-Electronic Press Ltd.
Phone: 01-261 8697 or simply complete and return the form below.

To: Brian Durrant, Reprints Department
Dorset House, Stamford Street, London SE1 9LU

I am interested in .....copies of the article/advertisement headed..... featured in COMPUTER WEEKLY on page(s)..... in the issue dated .....

Please send me full details of your reprint service by return of post.

Name .....
Company .....
Address .....
.....Tel. No.....

WE BUY COMPUTERS

All kinds, including Adler, BCL, Burroughs, IME, Kienzle, Logabax, Mast, NCR, Nixdorf, Olivetti, Philips, Singer, etc.

E.O.S. EQUIPMENT LTD.
1 Rosedale Avenue
Sunderland SR6 8BD
Tel. 0783 293818

WANTED FOR CASH

Second-hand Teletype 33's
Best prices paid
Tel: 0442-82 4011
Ext. 24

FOR LEASE OR SALE

I.B.M. 370/155 WITH DAT BOX

AVAILABLE
1st QUARTER 1978

REPLIES BOX 1910, Computer Weekly

FOR SALE £39

V24 TO CURRANT LOOP CONVERTERS

For further details
Tel: Vic Way of V. G. Developments Ltd.
on 0234 768677

CRB
A Computer World Trade Company

COMPUTER RESALE BROKERS INTERNATIONAL LTD.
Queen's Hse, Holly Rd, Twickenham, Middx TW1 4EH. tel: 01-891 0731. telex: 935122

WANTED

End-User requires

DEC PDP 11/04 or 5 or 10 or ETC SERIES

With minimum 28K words c.s.
Minimum MASS storage equal to 1 Mbytes — maximum 20 Mbytes. The machine should include sufficient terminal capacity.

Write to.
CRISTIE ELECTRONICS LTD. P.O. Box 16, Stroud, Glos. or TEL. 04536 77808

IMMEDIATE DELIVERY OF NEW

PDP II v 03

Floppy Disc Systems with software packages for STOCK CONTROL PRODUCTION CONTROL LEDGER ANALYSIS

Also available:
Low cost version of these packages supplied with Intel/Memorex floppy disc system at prices from £6,000 complete.

data-J

Data-J Ltd., 7 Churchill Court, Rustington, Sussex
Tel: 09062-72902

KEY OPERATIONS ASSISTANCE LTD

CONTRACT

★ *OPERATORS* ★
★ *PROGRAMMERS* ★
★ *PUNCH OPERATORS* ★

LEADING SUPPLIERS OF CONTRACT OPERATIONS PERSONNEL THROUGHOUT EUROPE

SAVE TIME AND MONEY CALL US FIRST

01-493 6696
01-499 1787

EUROPS EUROPS

4 HALF MOON STREET, LONDON W1Y 7RA

COMPUTER WEEKLY

The following special supplement is due to be published during

DECEMBER

DECEMBER 8 — ACCESSORIES AND ANCILLARIES

The efficient running of a computer department and the effective use of computer output depends to a great extent on the adequacy of the ancillary equipment.

Paper supplies, the security system, cleaning equipment, etc., are all small but vital factors in machineroom housekeeping.

On December 8 Computer Weekly will be taking a look at the computer room's vital fringe and some of the new products available

LONDON AND WESTERN
Stephen Measures 01-261 8283, Tony Kaminski 01-261 8022, Stuart Moore 01-261 8109, Lloyd Collins 01-261 8757.

MIDLAND
Ken Parrott 021-356 4838

NORTH AND SCOTLAND
Harry Aiken 061-872 4211

Stop Press. Computer Weekly continues to publish more product and recruitment advertising and has a higher fully requested A.B.C. (Audit Bureau Circulation) of 76,081 than any other U.K. computer publication.

★ Additional 19,138 regular readers in Western Europe via the INTERNATIONAL EDITION which is published the 2nd week in every month excluding August and December.

YOU NEED THE BEST SO FORGET THE REST

Contact Sarah Smith on 01-283 3237 for

★ Top-quality contract programming staff always available
★ Rates from £150 to £220 per week
★ References checked and work guaranteed
★ Permanent staff also available

MARTON associates 206-210 Bishopsgate, EC2
FOR COMPUTER PEOPLE AT THE CROSSROADS

PDP 11 EQUIPMENT FOR SALE

PDP 11/45 32Kb core computer with console, etc.	£25,000
128Kb parity core memory	£11,000
32Kb semi-conductor core memory	£8,000
Floating point processor	£3,000
RP04 disc drive and controller	£17,000
RP04 disc drive	£15,000
9 track TU10 tape drive and controller	£7,000
One 9 track and on 7 track TU10 tape drive	£5,000 each
Two 132 column line printers (300lpm)	£5,500 each
16 line DH11-AC Multiplexer	£2,750

Equipment purchased in January 1976 and available in January 1978. All equipment maintained by D.E.C. and all prices exclude V.A.T. and are negotiable.

B. D. F. MANSFIELD
Singer & Friedlander Limited, 20 Cannon Street, London EC4M 6XE
Telephone: 01-248 9646

FOR SALE

2 DATA PLEX MODUL D1200

Magnetic Card Mini Computer Twin Magnetic card readers/recorders.

20 C P S 10P with keyboard Complete with desk and electronic logic, 2 VDUs and approx 400 mag cards. Offers are sought for these machines which are 1 year old and have been fully maintained by the makers.

Telephone: Mr. Groen
0240 4-2563

tap

IBM COMPUTER TIME and Bureau Services Central London Attractive Rates

PHONE
01-836 0355
01-242 9283

Time and People Limited

2 BOTTLES OF WHISKY for 2 BOXES OF PUNCH CARDS

Who can beat that?!!

Phone for details of above offer now!

DATAWASTE LTD., 01-960 1000

Contract Staff available

for Home and Overseas assignments

Metra Lowndes-Ajax

01 680 2400

Metra Lowndes-Ajax
119 High Street, Croydon CR0 1QJ
We are always interested in hearing from people who wish to work on a contract basis

CAN YOU AFFORD TO LOSE YOUR MEMORY?

One 150 kVA Transipak Uninterruptible Power Supply computer grade, available for immediate delivery complete with battery.

Write or telephone to
CHLORIDE TRANSIPAK LTD
Stanley Road, Bromley, Kent
Tel: 01-460 9881

THE TELEPRINTER SHOP

★ 120 CPS TALLY 1612	£1995
★ 80 CPS DI-AN 30	£1580
★ 30 CPS DECWRITER	£926
★ 30 CPS TELETYPE 43	£800

Area Sales Tel
Midlands 021 459 5959
Scotland 041-221 9761
Wales Oswestry 2191

DATA DESIGN TECHNIQUES LTD.
9 Watkin Road, Wembley, Middx.
Tel. 01-903 6977

OPERATORS KPG PROGRAMMERS KPG KEY PUNCH OPERATORS KPG

SUPPORT SERVICES YOU KNOW YOU CAN RELY UPON

KPG Ltd 28 THE BUTTS BRENTFORD MIDDX 01-568 7345

ADP **Automatic Data Processing**
Management Dynamics Division

DATA PREPARATION SERVICES
CARDS: PAPER TAPE: MAG.TAPE

Heathrow House, Bath Road,
Cranford, Hounslow, Middlesex, TW5 9QP
Telephone 01-759 9191/1502/9628

J & M COMPUTERS
FOR SALE
IBM 3980 Systems
3981 Computing Concentrator
3982 Model 1 and Model 2 Remote and Local Terminals
47 High Road, Rayleigh, Essex
Tel: Rayleigh (0268) 742851

FOCUS
computer services limited

CONTRACT or PERMANENT—

ANALYSTS - PROGRAMMERS - OPERATORS
PUNCH OPERATORS - DATA CONTROLLERS

Tel. 01-487 5781 28A Devonshire Street - London - W1
Licence No. 851(A)17

CDL for IBM DATA PREPARATION EQUIPMENT.

Brokerage service for used Computer and Peripheral Hardware
FOR ADVICE ON
BUYING-SELLING or MAINTENANCE
Call 02774 58028/9
Commercial Data Ltd
2 Holly Court, Billericay, Essex

HEXAGON computer services

01-499-3671

145 WARDOUR STREET, LONDON W1V 3TB

Contract & Permanent recruitment
Total DP Support at [illegible]
Programming, Operating
Data Preparation, Systems
Data Control, Technical Support

PEOPLE

Charity with a punch

A FUND-RAISING effort by punch operators of the NCB has raised enough money to buy a guide dog for a blind person.

The 40 punch girls at the Coal Board's Cannock Computer Centre have raised £500 in 12 months, by organising weekly collections and various events.

A disco brought in £100, and at Christmas they made up hampers and raffled them.

Although their fund-raising activities have been going on for several years, this is their most ambitious effort so far. The money will pay for the purchase, training and upkeep of one guide dog, and in fact £12 was left over, to be put towards their next effort.

THE Midlands Regional Officer of the Guide Dogs for the Blind Association, Charles Whittle, receives a cheque for £500 from Christine Lomas representing punch operators at NCB Cannock.

Eileen Bubrick of Houston Instrument in Austin, Texas, has been promoted from programmer/analyst to software support manager.

William Gott has become director of product marketing for Qume in Hayward, California. He was most recently marketing manager for terminals and peripherals with Texas Instruments.

Michael Dixon has been appointed sales manager with LUCS, the London subsidiary, of the US United Computing Systems. He joins the company from CDC Data Services UK, where he was product sales manager for commercial bureau services. **Brian Sutton**, formerly sales and technical support manager, has been appointed marketing and technical manager.

Allan Currier has joined Harris as Northern area sales executive, based in Manchester. Previously he held the same position with Modcomp.

David Robinson becomes static analyst with 3M's Manchester office; his last job was as sales agent with Certified Laboratories Ltd of Warley.

Paul Bryam-Tatham, who until recently has been technical sales executive responsible for management sciences/linear programming at Scicon, has been appointed overseas co-ordinator.

Michael Lorimer has been appointed financial controller and company secretary of Inforex, where he will also be responsible for general admin. He was previously group accountant for Manthel Holdings of Wellington, New Zealand.

Peter Crofts, lately senior consultant in Rank Xerox' maintenance software group, has gone to Computer Associates UK as senior technical support consultant.

Owl raffle

CUDDLY owls raffled by Nashua on its stand at Compec were won by:

Colin Webb, Air Products of New Malden, Surrey;

S. V. Shepherd, AWRE, Aldermaston;

David Summers, NatWest.

John Shapcott of Extel has been promoted from senior sales executive to sales and marketing manager. **Ray Hoare** joins as a sales executive, and **Nick Campbell** and **Julian Costley** as sales reps.

Peter Blackman, formerly an analyst with Programming and Software Implementation, has joined Harrison as a systems analyst. **Fred Kitchener** joins as a programmer, from Framlington Computer Services, a subsidiary of London Merchant Securities.

Tony Lay, David Martin and **Kim Jenkins** have joined Package Programs Ltd as systems consultants. Lay formerly worked for Factory Mutual International as a systems analyst, and at present is taking his finals to become a certified accountant; at PPL he will introduce the MMS package to the UK. Martin was formerly a programmer with Hoskyns Systems, and Jenkins was a programmer with Private Patients Plan Ltd; both were recruited as ICL consultants.

Peter Airs and **Dinos Appia** have become APL consultants with I. P. Sharp. Airs recently got his MSc from Westfield University College London, and was formerly a programmer with Fraser Williams, while Appia was previously a lecturer in mathematics at the University of the West Indies in Trinidad.

Calls for papers

PAPERS are solicited for the third conference on Artificial Intelligence to be held in Hamburg on July 18-20, 1978. It is co-sponsored by the Society for the Study of Artificial Intelligence and the Gesellschaft Für Informatik. Three Review Lectures, on representation of knowledge, programming methodology and vision systems, will be given, and the organisers will consider both papers whose subjects overlap with these lectures, and papers on other subjects. For further details contact the Programme Chairman, Derek Sleeman Dept of Computer Studies, The University, Leeds LS2 9JT.

ABSTRACTS are invited for a workshop on computing skills and adaptive systems to be held on March 21-22 and sponsored by the University of Liverpool Computer Laboratory. The acquisition and exercise of programming skills; psychological variables in the design of programming languages; interfacing interactive systems; the provision of guidance to non-professional computer users; experimental design and method in the investigation of computing behaviour, are some of the possible topics. Length of abstracts should be 300 words and the deadline for submission is December 24. Papers should be sent to the Secretary, Computing Skills Workshop, Computer Laboratory, University of Liverpool, P.O. Box 147, Liverpool L69 3BX.

COURSES

A MICROPROCESSOR course is offered by Hatfield Polytechnic. It will take place over a period of eight consecutive Wednesdays from 2 until 8 pm, between January 11 and March 1. The Polytechnic's DEC system-10 will be used for practical work. The course fee is £110. Further details and applications forms from Mrs P. Ingram, School of Information Sciences, Hatfield Polytechnic, PO Box 109, Hatfield, AL10 9AB.

MANAGEMENT courses and seminars from the British Institute of Management include Selection Interviewing, January 16 and Creating an Atmosphere for Change, January 24-25. Both of these take place in London but courses are offered by the BIM in other parts of the country. For details contact Mrs V. Boone, Management House, Parker Street, London WC2B 5PT, tel: 01-405 3456.

THE courses brochure from the Inbucon Management Development Service for January 1978 to mid-1979 is now available. The range of about 70 courses includes titles such as Computer Appreciation for Business Executives, Company Doctoring for Improved Profitability, Marketing and Selling into Europe, and many more, grouped under the general headings of executive development, general management and law, finance, marketing and selling, personnel, production, purchasing, development and data processing. Further details from the Course Registrar, PO Box 28, Camberley GU16 5RH, tel: 0276 20214.

DIARY

DECEMBER 5

Big brother is watching you, OK? P.A. Sanet. BCS, East Anglia branch. Norwich Union offices, Norwich, 19.00.

Computer networks seminar. National Committee on Computer Networks. NCC, Oxford Road, Manchester. Reservations £5.40 from NCC (above address). Tel: 061-228 6333.

Program design, Michael Jackson. BCS, Glasgow branch. Daniel Brown's Restaurant, Glasgow. 19.00.

Social aspects of machine intelligence. Edinburgh University Machine Intelligence Research Unit. Hume Tower, George Square, Edinburgh. 17.15.

DECEMBER 5-9

Third symposium on computing methods in applied sciences and engineering. Institut de Recherche d'Informatique et d'Automatique. Versailles, France. Details: IRIA, Service des Relations Extérieures, Domaine de Voluceau, Rocquencourt, 78150 Le Chesnay, France. Tel. 954 90 20.

DECEMBER 6

Operations, profession or trade? Dick Walker, Ted Cluff, BCS Operations Group. BOC Datasolve, Hammersmith House, Blacks Road, London W6. 18.00.

Computerised submarine. R. Hopgood. BCS, NW London branch. Railway Hotel, Greenford, Middx. 19.00.

APL Group meeting. BCS, Hampshire branch. Portsmouth Management Centre, Portsmouth. 19.00.

Visit to British Steel — Computers in process control. BCS, Bristol branch. BSC, Spencer Works, Llanwern. 17.30. Those wishing to attend should contact the branch secretary.

Word processing. M. Robins. BCS, Wolverhampton branch. The Polytechnic, Wolverhampton. 19.00

Subject selected by speaker. Michael Hamilton, MP. BCS, Merseyside branch. Adelphi Hotel, Liverpool, 17.00.

A systems approach to pictorial pattern recognition — lecture series. Morton Nadler. Machine Intelligence Research Unit. Chess Lab. MIRU, University of Edinburgh. 10.30.

DECEMBER 6-7

General meeting. RTL/2 User Group. Excelsior Hotel, London (Heathrow). Details: SPL International, 01-636 7833.

DECEMBER 7

Management Education Seminars — How to succeed with standards. Pat Crocker. Data Processing Management Association. Montcalm Hotel, London W1. 14.00.

Exhibition and demonstration of university, schools, industrial and armed services projects. National Development Programme in Computer-Assisted Learning. Addison Restaurant, Olympia, London. Details: 01-637 0552.

Developments in data capture. Malcolm Brighton. BCS Study Group for Computers in Survey Analysis. Polytechnic of North London, London N7. 17.30.

Performance management in HM Customs and Excise. Neville Greenhalgh, Victor Whittington. BCS, S. Essex branch. The Bull's Eye, Basildon. 19.45.

Student evening. BCS, Sussex branch. Brighton Polytechnic, Moulscomb, Brighton. 19.30.

Medical care management. Prof J. Anderson. BCS, Belfast branch. Windsor Hotel, Belfast. 19.30.

DECEMBER 7-8

Meeting. IBM Computer Users' Association Telecomms Group, Holiday Inn, Liverpool.

DECEMBER 8

Computers and music. J. Dunn. BCS, North Staffs branch. Computer Centre, N Staffs Polytechnic, Stafford. 20.00.

The impact of electronics, conference. Electronics Weekly magazine. Hilton Hotel, London. 9.00.

COM, a user's view. BCS, Birmingham branch. Priory Dene Hotel, Edgbaston, Birmingham. 19.30.

Microprocessors and their applications. Dr J. P. Race. BCS, S Yorkshire branch. Heriot House, City Polytechnic, Sheffield. 19.30. BCS Members only.

Library automation/buffet supper. Bruce Royan. BCS, Newcastle branch. Barras Bridge Bldg, University of Newcastle. 19.00.

DECEMBER 9

Some aspects of medical computing in Europe, seminar. BCS Medical (London) Group. The London Hospital, London E1. 9.50. Tickets from Mrs P. Gunrip, 0277 223470.

DECEMBER 10

Annual income £103 million, annual expenditure . . .? BCS, Kent branch. St George Hotel, Chatham. 19.30.

DECEMBER 12

Visit to Prime Computer. BCS, Bedford branch. Applications to branch secretary.

Objectives and methods of computer science education. S. Michaelson. BCS, Humberside branch. The White Rose, Hull. 19.30.

DECEMBER 13

16-bit microprocessors — F100L, 9900 micros. BCS Microprocessors Group. Polytechnic of Central London, London W1. 14.00.

Making a database work. Malcolm Robinson. BCS, Croydon branch. Fairfield Halls, Croydon. 19.15.

Control of distributed projects. Suzette Harald. BCS, Reading branch. The Griffin, Caversham. 20.00.

Why did we choose DEC Kl? Brian Castle. BCS First Time User Group. Royal Angus Hotel, Birmingham 4. 14.00.

DECEMBER 13-18

1st international online information meeting. Online Review, Tara Hotel, London.

DECEMBER 14

What should and what will happen to Cobol. J. R. Lucking. BCS Cobol Group. Polytechnic of Central London, London W1. 14.15.

Tomorrow's World, the mass market for computers. John Burnett. Association of Independent Computer Specialists... AICS, 8 Leicester Street, London WC2. 18.30.

Structured programming. Alan Cohen. BCS, North London branch. West Lodge Park Hotel, Cockfosters. 19.45.

Creative computing. Alan Sutcliffe. BCS, Teesside branch. Teesside Polytechnic, Middlesbrough. 19.00.

Trade unions and computer personnel, open forum. Representatives from APEX, ASTMS and NALGO. BCS, Edinburgh branch. Mountbatten Bldg, Heriot-Watt University, Edinburgh. 17.30.

DECEMBER 15

AGM/BSAL-80 for the Intel 8080/SIL Snobol for the 2900/Spitbol. J. Knott, Dr Snobol for the 2900/Spitbol. J. Knott, Dr M. Garside, Dr A. McCann. BCS System Implementation Languages Group. Birkbeck College, London WC1. 10.30.

Management development. DPMA Central London branch. Control Data Institute, 77 Wells St, London W1. 18.00 for 18.30.

The use of microprocessors in robotics. Dr Paul Drazen. BCS, Guildford branch. Robotics Lab, University of Surrey, Guildford. 19.30.

DECEMBER 15-16

Meeting. IBM Computer Users' Association Operations Group. Palace Court Hotel, Bournemouth.

DECEMBER 16

Minicomference on minicomputers for information retrieval. BCS Information Retrieval Group/Aslib Informatics Group on Minicomputers for Information Retrieval. University of Manchester Institute for Science and Technology, Manchester. 11.00.

DECEMBER 20

Human reliability in man-machine systems. colloquium. Institution of Electrical Engineers IEE, Savoy Place, London WC2. 10.30 Register with IEE.

A systems approach to pictorial pattern recognition — lecture series. Morton Nadler. Machine Intelligence Research Unit. Chess Lab, MIRU, University of Edinburgh. 10.30.

JANUARY 3

Computerised tomographical scanning, lecture. Institution of Electrical Engineers IEE, Savoy Place, London WC2. 5.00 for 5.30.

JANUARY 9

Integrated circuits — reliability, colloquium. Institution of Electrical Engineers, IEE, Savoy Place, London WC2. 13.30. Register with IEE.

JANUARY 10

Practical Honeywell computing. Speakers from Honeywell Information Systems. Data Processing Management Association. Bull Hotel, Gerrards Cross, 19.45.

Why a bureau is the best solution for a first time user. BCS First Time User Group. Royal Angus Hotel, Birmingham 4. 14.00.

JANUARY 11

International telex switching systems. C. C. Harman, E. E. Daniels. Institution of Electrical Engineers, IEE, Savoy Place, London WC2. 5.00 for 5.30.

What this DPM thinks of the independent computer specialist. Gerry Fisher, Association of Independent Computer Specialists, AICS, 8 Leicester Street, London WC2. 18.30.

Sponsored by Computer Weekly Data Processing

COMPEC EUROPE'78

CENTRE INTERNATIONAL ROGIER, BRUSSELS

May 9, 10 and 11, 1978

The third annual specialised exhibition devoted solely and exclusively to small computers, computer peripherals and systems to be staged in Brussels

COMPEC EUROPE in 1977 drew 5,300 visitors from the cream of the computer world. They came from as far away as the USA, Russia, Japan, Finland, Italy, Hungary and Poland – as well as from the great industrial areas of Germany, Holland, Belgium, France and the United Kingdom.

COMPEC EUROPE is sponsored by the leading United Kingdom publications "Computer Weekly" and "Data Processing", and is organised for them by Illife Promotions. All are members of IPC Business Press at Dorset House, Stamford Street, London, SE1 9LU, England. Telephone: 01-261 8000. Telex: 25137 BISPRS G

To: Chris Timmins, Exhibition Manager, Compec Europe, Room 821, Dorset House, Stamford Street, London, SE1 9LU, England.

* I wish to exhibit at COMPEC EUROPE '78 – please send me details.

* I wish to visit COMPEC EUROPE'78 – please send me ..... (number) free pre-registration tickets.

*Complete and delete as applicable.

Name

Street and Number

Town

District and Postcode

Country

Cost of Post Office services criticised

HARSH criticism of the Post Office's attitude towards its customers and the costs of its communication services, emerge from the survey of the Post Office carried out by the Data Processing Management Association and Langton Information Systems.

The survey also shows that organisations do not expect their use of communications to change much despite the advent of electronic mail and international information networks.

As expected (CW, November 10) the cost of Post Office services received most criticism. Half the organisations polled said costs were a firm deterrent to introducing communications systems, and 24% said systems were often rejected because of them.

Half of those questioned also thought that the Post Office was slow to respond to users' needs. One user said, "The problem is finding the right person with the required information within the Post Office organisation."

Another said the Post Office did not have the practical experience of the day-to-day problems of controlling a commercial organisation.

This comment was taken further by a question on the Post Office's level of consultation with users. One user said, "All efforts should be made to direct the Post Office's attention to the real world of data processing."

Another suggested that the DPMA should be on an executive committee set up to steer the Post Office.

Respondents agreed with the Carter Committee's proposal that the Post Office's communications activities should be split from the postal business. They also called for greater freedom and competition, arguing that the monopoly was impeding development.

Users were conservative about their future use of communications. Electronic mail was regarded as too far in the future even to start working out costs, and few users saw any great increase in facsimile or graphics transmission.

Similarly, 80% did not envisage any significant change in their participation in public networks or in their use of external information systems.

Viewdata and word processing fared slightly better. Almost 20% said they would be doing much more text transmission and 21% said there would be a substantial change in their communications plans because of Viewdata.

A typical comment was, "If a cheap, flexible, Post Office-rented terminal with a built-in modem arose from Viewdata we would seriously consider using it for our larger networks."

The result of the survey has been sent to the Post Office, the Carter Committee and the government.

A fully-tabulated report will be available soon at £3, or £2 to DPMA members, from the DPMA, 27a York Road, Maidenhead SL6 1SQ or from Langton Information Systems Ltd, 74 Newman Street, London W.1.

Installation guide for the layman

A LAYMAN'S guide to installing a computer has been produced for directors and senior managers of small businesses as part of the Input Two-Nine series on current aspects of computer technology.

The guide, Computerisation for the Small Business', was written by Edward Cluff and Alan Simpson, both officials of the Data Processing Management Association.

It starts with basics, going into the reasons for installing a computer. One chapter explains files, batch and interactive processing and distributed computing in simple terms and the guide then moves on to selecting a computer, choosing between software packages, turnkey systems and in-house staff, bureau services, finance and the second hand market.

Chapters on running the computer look at data preparation, input, operating costs, maintenance, standby, security and management. The appendices list questions designed to reveal the information needs of different company departments.

The guide is comprehensive in the range of topics it covers and would make valuable preliminary reading for companies buying a computer for the first time.

Perhaps two failings of the book are that the chapter on costs deals in general terms rather than giving examples of costs, and the absence of useful names and addresses. Organisations like the National Computing Centre, for example, are mentioned only briefly in passing. But it is a useful book none the less.

*Computerisation for the Small Business, by Edward Cluff and Alan Simpson. 166pp. £9.95 or £8.50 to DPMA members. Input Two-Nine, Banstead Road, Purley, Surrey CR2 3ER.

BIS profits doubled

A 53% INCREASE in turnover and a doubling of profit was recorded by Business Intelligence Services, the UK consultancy, market research and training group, in its financial year which ended on February 28. The group expects similar growth in turnover this year.

Turnover went up from £1.7 million to £2.7 million in 1976-77. Pre-tax profit rose from £142,000 to £355,500. Overseas business accounted for 35% of income.

During the year the group opened a New York office for BIS Software, and a Sydney office for BIS Marketing Research.

NEWS IN BRIEF

Shop window in Abu Dhabi

A PERMANENT showcase for British products is to be opened in Abu Dhabi in a bid to win business from the oil-rich United Arab Emirates. Exhibits will be on permanent display at the two-floor centre and open to view six days a week.

Sites are booked on a one-year renewable basis at a cost of from £2,500. Back-up marketing services will also be provided.

Weather system

FRENCH weather forecasting body Meteo France is to install a Control Data Cyber 175 alongside its existing CDC 6400 installed in 1967. The 175 replaces a Cyber 74 installed in 1972. It will share 2.5 million characters of extended core storage with the 6400.

£100,000 order

AN order worth £100,000 has been placed with the Turnkey Division of CMS for a 160K DEC DataSystem 537, by Avimo Ltd, optical and mechanical engineers of Taunton, Somerset. The system, which will support eight terminals, is due to be installed in December.

First survey

FIRST annual survey of the European computing services industry has been published by the European Computing Services Association. The survey analyses the processing, consultancy and data preparation sectors of the industry in 14 countries and gives details of service companies. It costs $80 to members and $210 to non-members from Quantum Science Corp, Norfolk House, St. James's Square, London SW1.

Kode wins order

CASH and carry wholesaler, Makro, has placed an order worth £105,000 with Kode for 14 Datanet terminals. These will be used to transmit sales data from the company's six warehouses to its headquarters at Manchester for overnight processing.

CTL installation

A CTL Model 8030 computer system worth £60,000 has been installed by Michael Davis (Shipping) Ltd of Richmond, Surrey. The system consists of the CPU, 48K of memory, paper tape reader, cartridge disc drive, four VDUs and a printer.

Computel

would like to express their appreciation to the 250 senior computing executives who last week attended the four one-day presentations '2500 – The Computel Experience' at our new Computer Centre at Bracknell.

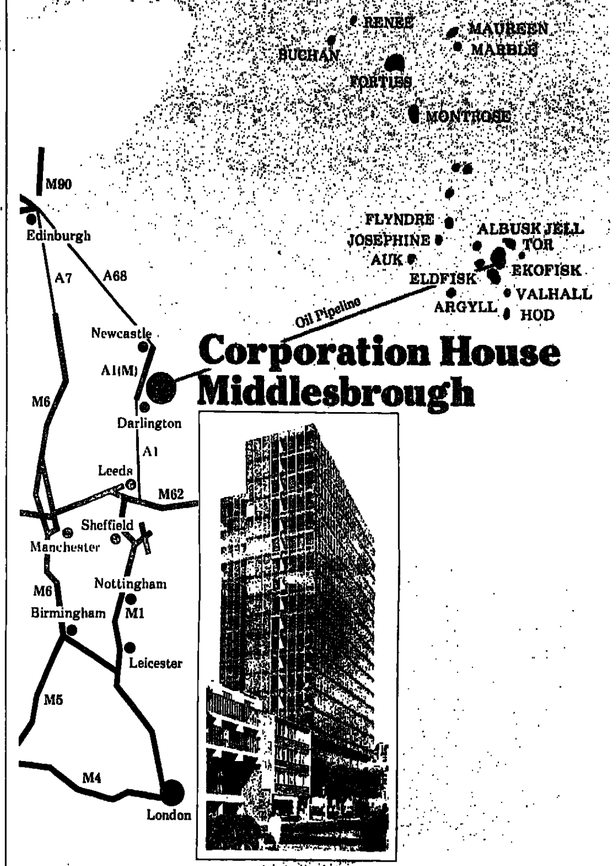
We thank them for their interest and look forward to helping them keep up with the changing computer scene.

computel

Where we build on experience to set the pace.

On or offshore activities...

we could solve your office problems



Corporation House Middlesbrough

Only 13,500 sq ft remaining in this first class office block, finished to an extremely high standard and offering the following amenities:—

★ Automatic passenger lifts
★ Carpeted throughout
★ Suspended ceilings
★ Private car parking
★ Full central heating
★ Close Teesside Airport
★ Few minutes' walk, docks, station and shopping area

So why not stake your claim now and take advantage of the competitive rental and generous Government grants.

For further information contact:

Hillier Parker May & Rowden

77 Grosvenor Street, London W1A 2BT. Tel: 01-629 7666

LAMB & EDGE Established 1876

86 Blackett Street, Newcastle upon Tyne NE1 7UB. Tel: 0632 612361

HC 110 version of the Phonic Mirror Handivoice is capable of producing nearly 500 words for the vocally impaired, all from a basis of 45 phonemes.

Talking device for vocally impaired

THE problems of communication faced by people who are non-verbal and non-vocal are among the most severe of any handicapped group. Hence it is interesting to see the introduction in the US of the Phonic Mirror Handivoice, a micro-based tool aimed specifically at providing speech communications capabilities to this group.

Being marketed by HC Electronics Inc, a subsidiary of the American Hospital Supply Corp, the system has been developed by Votrax, a company which specialises in phoneme-based speech simulation equipment.

Two types of portable, battery operated units of Handivoice have been developed.

The HC 110 uses a lap-board approach to serve the needs of the developmentally disabled user. It incorporates a 128-key display area and up to five display area overlays, each of which assigns a word, phrase or pictorially represented word to the keys.

It is pre-programmed with 373 words, constructed from a basic store of 45 phonemes and 16 short phrases, such as "My name is". Also included are 13 morphemes, which are word prefixes and suffixes, and the 26 letter English alphabet.

This gives the unit a potentially unlimited vocabulary and operation is by using the required overlay over the display area and pressing the keys.

The HC 120 unit is for more experienced users. It uses a calculator type keyboard as the input medium for a three-digit code that can be used to represent up to 999 different words or phrases. In other respects, its capabilities are similar to those of HC 110.

In Europe, they will be available through Phonic Ear International A/S Formervangen 34, DK2600 Glostrup, Copenhagen, Denmark.

Shape of products to come from Motorola

NEXT year will be a busy one for the microprocessor industry, with the news that Motorola is joining Zilog and Intel with new product introductions including a 16-bit device to be known as MACS.

Definite introductions by Motorola next year are to be the 6809 and 6801 processors, both scheduled for sampling during the third quarter of 1978.

The 6809, still officially on the Motorola "secret list", has been designed as an upgrade of the 6800, 8-bit processor. Source program compatible with the 6800, the 6809 will be equipped with an increased instruction set of 80, and will have 348 operator codes. Although still an 8-bit device, the part will be able to handle 16-bit data words, as it is equipped with the ability to address various registers as one, rather than individuals.

It will also be equipped with three extra registers, one of which will be an extra index register. The device will also have a new bus structure allowing faster operation. 11 modes of address, and the facility to do up to 8 x 8 multiplication. Division capabilities, however, are not provided. Direct memory addressing capability is 64K bytes, although memory addressing over this figure is said to be easy using a page mode.

One of the main areas of use for the 6809, as seen by Motorola, is in applications utilising very high level languages where a "super" compiler is required. It is seen as eminently suitable for operations with such languages as Fortran and Cobol.

The second introduction, the 6801 processor, is also source program level compatible with the 6800 device. Aimed squarely at the single chip control market, the part will feature around 1K of ROM and 96 bytes of RAM, and will have a flexible I/O structure, based on 28 I/O lines.

Still under wraps and with no definite introduction date beyond "the end of the year", the Motorola Advanced Computer System, 16 bit processor will be joining the "16K equivalent" stakes with a processing power that should be equivalent to a PDP-11/45. As sources indicate, it will certainly be a complex part and will contain around 100,000 devices on the chip.

Byte Shop chain to stay independent

THE news that the Byte Shop chain of retail computer stores in the US has been purchased by the Logical Machine Corp (CW, November 24) due to "experiencing capitalisation problems despite a brisk sales pace", can be taken as a sign of the problems involved in bringing high technology into the high streets.

There have been reports from the US that all may not be as well as it might be with the growing number of computer oriented retail outlets that have sprung up across the Atlantic. Such reports have indicated that the overall level of business has stabilised, and in some cases dipped, while others have shown that sales have shifted towards add-ons and peripherals rather than processor systems, thus indicating that the initial system market has been filled.

Trends such as these, not uncommon in an untried market, can often require considerable finance to overcome, and it is therefore not surprising to see new finance coming into a potentially lucrative long term market.

It also makes sense for that finance to come from within the computer industry and in explaining the move, Logical's president, a British expatriate John Peers said, "We decided to extend our penetration into areas where conventional marketing costs do not allow microcomputer systems to be effectively sold and supported. The tiny first-time business user and the personal domestic market are examples of these sectors."

Logical plans to invest both money and expertise in the Byte chain. "There is no alternative to expansion," Peers said. "We are going to open up as many professional and well-funded retail outlets worldwide as we possibly can, and we are seeking people with the knowledge and ability to join us."

Peers sees the purchase as enlarging the scope of Logical's operations, moving the company's product capability downward towards micros.

The company is best known for its Adam computer system, of which 350 have so far been installed. The Byte Shops, however, will not be integrated into the Adam operations, and will be run as an independent business.

Conference proceedings

THE proceedings of the first International Microcomputers, Minicomputers and Microprocessors conference, held last June, in Geneva, are now available from IPC Science and Technology Press.

Comprising a complete record of the technical sessions of the conference, the book provides information on such topics as costings and economics of microprocessor based products, mini-microcomputers in real time systems, hardware/software design trade-offs, testing and reliability of microprocessors, higher-level languages and programming and trade-offs for mini/microcomputer selection.

International Microcomputers / Minicomputers / Microprocessors '77, pp. 368, £19. Available from IPC Science and Technology Press (Books Department), 32 High Street, Guildford, Surrey.

Course announcement

"ASSEMBLY Language Programming for Microprocessors" is the title of a two-day course to be held at the City University, London, on December 15 and 16.

The object will be to provide practical experience of the writing, assembling, and execution of programs for microprocessors. A cross-assembler and simulator will be available for use, and the course will include hands-on operation of micro development systems.

The registration fee is £90, including lunches, course materials and computer time, and attendance will be limited to 15 delegates.

Enquiries for the course should be addressed to Dr A G Davies, Department of Electrical and Electronic Engineering, The City University, St. Johns Street, London. Telephone 01-253 4399 ext 70.

Evaluation plans for Mickie and Mavis

THREE Mavis systems, the audio visual equipment developed at Loughborough University and the National Physical Laboratory (CW, September 15), are to be built by Ferranti for evaluation.

These will incorporate either floppy discs or bubble memory, and be based on the Zilog Z80 micro. First production models are expected to be ready by the middle of next year.

Another NPL project, Mickie, the hospital patient interviewing system (CW, June 9), has received backing from the Department of Health and Social Security, and five models have been ordered for evaluation.

Meanwhile in the Commons the possibility of severely handicapped people being provided with computer terminals or VDUs in their own homes was suggested by Lewis Carter-Jones, Labour MP for Eccles.

Commenting on information about assistance provided by the Training Services Agency to train disabled people as programmers, Mr Carter-Jones said he wanted a lot more done than he had been told about by John Grant, Under Secretary for Employment.

"The difficulty is spreading the knowledge of what is possible," he said. "It needs motivation on the part of the disabled and the will to help by employers."

In his reply, Mr Grant said that training in computer programming was available under the Training Services Agency's scheme in colleges of further education, private colleges and with computer manufacturers.

"In addition the TSA is sponsoring two pilot courses in computer programming on a residential basis in co-operation with the BCS specifically for severely disabled people.

"Computer training for visually handicappped people is available through arrangements made between the TSA and the Royal National Institute for the Blind."

Mr Carter-Jones said there should be more residential courses like the two being run with the BCS.

The 24-character strip display on the Xerox 850 word processor enables text to be edited before being printed out. Each of the unit's two floppy discs can store 140 pages of text.

Xerox moves into word processing

A RANGE of advanced word processing systems has been introduced in the US by Xerox. Known as the 850 and based on development work done at the company's Palo Alto Research Centre, the system comes in both screen and teleprinter-oriented configurations. Up to 280 pages of text can be stored.

Each 850 has a processor with integrated dual floppy disc drives. Other devices for printing, communications and magnetic storage are available, as well as interfaces for IBM equipment.

A feature of the 850 is a cursor control that responds to the touch of a finger on a flat disc. The CAT, short for capacity activated transducer, is said to be easier to use and more suited to the office environment.

An 850 with a typewriter and plasma display 24 characters wide, will sell for $12,900, and the larger unit, with a 66-line, 102 character-wide screen, slave printer and CAT costs $18,600.

Xerox in the UK says that an 850 is being installed with a customer at the end of the year for an extended trial.

Rather than being based on work done by the text processing team at Palo Alto, the 850 is said to have derived from studies carried out by a group which has been looking at ways of using computers to aid learning.

The command structure of the 850 system is a close cousin to the information processing system, which is written in an interactive language called Small Talk. That language and the rest of the system is based on concepts attributed to Dr Alan Kay of PARC.

The 850 family and other work done at the research centre can perhaps be seen as interim steps towards what Dr Kay calls Dynabook, a personal computer the size of a book with the power of today's fast minis.

Swing from rentals grows at IBM

The trend away from rentals and towards outright sales at IBM is accelerating. Comparing the three months to September 30, 1977 with the same period in 1976, sales grew by 35% but rentals and services grew by only 5.7%. Comparing the nine months to end-September 1977 with the same nine months in 1976, the trend is less marked but still clear. Sales grew by 19% and rentals and services by 6.9%.

The costs and expenses of rentals and services are just about static at between 36.5 and 37.3% over both the three month and nine month periods, but the cost per sale is falling. Costs and expenses for sales in the three months to September 30, 1977, were 30.6%, down from 32% in the same three months of 1976. This fall is attributed by IBM to a change in the mix of products sold.

MPG

The high-level commercial applications programming language boosts productivity up to

500%

MANAGEMENT INFORMATION SYSTEMS PTY. LTD.
800 CHESHAM HOUSE, 150 REGENT STREET
LONDON W1R 5FA
Telephone: 01-439 8288 TELEX 261426

OP SPOT By Bernard Allen

The power game interrupted

THE lack of standby power supplies in computer installations was brought into focus by the recent power cuts.

These had a troublesome, rather than disastrous, effect in many of the installations to which I spoke. Many expressed annoyance at the inconvenience, but they had been able to overcome the problems with varying degrees of success and difficulty.

In retrospect, has DP management in general learnt anything of value from this episode, and would it be better prepared to deal with a similar situation in the future?

According to David Rees, project co-ordinator at the Standard Chartered Bank, "We have a generator and I don't see us changing our procedure much at all.

"We may be looking at no-break back-up sources in the future, because we are planning to increase our kit. Also the bank's dependence on computing is increasing and the cost of no-break systems is becoming more reasonable," he added.

The majority of installations have no firm back-up power. Such sites, Thames Polytechnic is one, are entirely at the mercy of cuts and are forced to wait until the power supply is resumed, or close for the day.

Comments Brian Fletcher, operations manager at the Poly, "There is nothing we can do about the situation because we cannot afford a generator and so will be in the same situation next time."

A survey by IDC Europa points out that the power cuts have prompted DP managers to take a closer look at the various standby power systems available.* It states that 13% are considering some sort of secondary power source (see Table 1).

The survey concludes that the lack of reserve electrical power sources can be attributed to a lack of foresight in planning an installation, and the small percentage of the DP budget that is dedicated to so-called environmental equipment. It is estimated that only 1% to 5% of the DP budget is allocated to computer room equipment.

It is clear that many users are unaware of the various faults and inefficiencies of electrical supply, and it is suggested that new users should check that incoming supplies are adequate to meet the expected maximum demand.

Generator	31%
Generator and static inverter	3%
Mobile generator	3%
Planning to use standby power	13%
Standby not used	66%

Table 1. How many are prepared for power cuts?

*The Market For Computer Room Equipment in the UK, £145. IDC Europa Ltd, 2 Bath Road, London W4 1LN.

4 BASIC BOOKS

For programmers and computer users

BASIC ALGOL

This is a fully revised and updated version of an already well-established primer in Algol programming. It is designed for those both inside and outside the computer industry and takes the reader step-by-step from a description of the binary system through Algol 60 to a point where the language can be used to write practical programs. **£1.10** inc. postage and packing.

BASIC PL/1

PL/1 is an open-ended language which can be adjusted to meet the demands of new hardware and systems. There is, therefore, no "basic" version, but to give beginners a guide to the language this book has been based on a subset of PL/1 implemented under DOS. This deals with only a limited number of features of the language but nevertheless, provides a sound introduction to the fundamentals. **£1.10** inc. postage and packing.

BASIC COBOL

This clear and concise introduction to the most widely used commercial computer language, provides the newcomer to programming with a comprehensive guide to the structure of Cobol and its applications. Based on Cobol 65, the text enables the student to gain sufficient knowledge of the language to write simple programs in preparation for more advanced studies. This new impression of the second edition is priced at **£2.20** inc. postage and packing.

FORTRAN BASICS

This book is designed as an introduction to Fortran for those who are newcomers to programming but who have a knowledge of elementary algebra. It takes the student step-by-step through programming with Fortran, establishing a firm base from which more extensive studies may be followed. **£1.10** inc. postage and packing.

ORDER FORM

To IPC Electrical-Electronic Press Ltd., General Sales Department, Room 11, Dorset House, Stamford Street, London SE1 9LU.

Please send me the following books as indicated (state number required)

BASIC ALGOL_____
BASIC COBOL_____
FORTRAN BASICS_____
BASIC PL/1_____

I enclose cheque/p.o. for £ _____ (payable to IPC Business Press Ltd.)

Signed_____ Date_____

Name (please print)_____

Address_____

Please send payment with order if value is under £25

Registered in England No 677128 Regd office: Dorset House, Stamford Street, London SE1 9LU

DIGITAL OEM NEWS

WE CAN DELIVER FASTER. FOR LESS.

Digital Equipment has added over 2.7 million square feet more space in eighteen months. 60% more capability!

So we can deliver the whole range of OEM equipment – from basic PDP-8 up to the PDP-11/70 – faster for lower cost.

Get in touch early – it's time you had some good news, isn't it?

CALL US!

Birmingham (021) 3555501
Bristol (0272) 851341
Epsom (3727) 29666
Leeds (0532) 588154
Leicester (0533) 530931
London Central (01) 8316351
London West (01) 5792334
Manchester (061) 8857011
Reading (0734) 585285
Welwyn (043871) 6111
Belfast (232) 52769/52760
Edinburgh (0589) 32705

digital

Digital Equipment Corporation

Digital Equipment Co. Limited, Digital House, Kings Road, Reading, RG1 4HS
Tel. (0734) 583555, Telex 848327/8

£50m boost for micro industry

● From front page

on the Miproc16 16-bit board system. Extremely fast for a micro, at 2.85 million instructions per second, the system is aimed primarily at the military and high speed communications markets.

Also aiming at the military, Ferranti has the F100-L single chip, 16-bit micro. Held up for a while through the lack of the interface chip set, the device does have chances in the commercial market. Its main problem is the lack of a second source for its production process. GEC Semiconductors is not in the main stream of manufacturing, and bases its operations on its agency agreement for the Intel family of processors, and is a major UK outlet for the device. It was the first company to produce a resident high level language compiler for the 8080.

● Following recent market developments, the Plessey Group is restructuring its worldwide activities in the fields of computer memories, minicomputer add-on memories, and peripherals, and microcomputer systems, previously covered by Plessey Memories and Plessey Microsystems. The memories and microcomputer activities will now be operated as Plessey Microsystems, based at Towcester, while the minicomputer add-on and peripheral operations become a new company called Plessey Peripheral Systems, based in Irvine, California.

P & O time sharing service

LATEST user to plan a time sharing bureau service is the P&O shipping group. To handle the service, the group's London office is expanding its mainframe from an IBM 370/135 to a 370/148. The VM/370 operating system will be added to the DOS/VS currently used.

Initially, the bureau service will be chiefly for the group's own subsidiaries, many of which at present use external bureaux. Outside users will, however, have access to the P&O machine. Among the languages to be provided will be APL and Basic.

GUEST CHESSLAB DANNY KOPEC

Machine victory

IN this Guest Chesslab, US National Master Danny Kopec, reports on the North American Computer Chess Championships, and provides a critical commentary on the game in which International Master David Levy lost to CHESS 4.6. Mr Kopec is at present a post-graduate student in the Department of Machine Intelligence at Edinburgh University.

THE October meeting of the ACM in Seattle produced the most exciting contest yet in the annual series of North American Computer Chess Championships. Chess 4.6 and Duchess drew in the fourth and final round to finish with 3½ points each and thus share the title.

Outside the tournament proper, Chess 4.6 played four games against the US speed champion, losing three and winning one. International Master David Levy played two speed games against Chess 4.6 and one against Duchess, losing all three.

In "speed" chess the machine is set to take an average of five seconds to select each move. The human must complete his first 60 moves in five minutes on his clock. If by then the machine has not either mated or announced mate the human player is the winner.

Greatest surprise of all, David Levy gave a simultaneous display against seven of the programs and managed to lose, against Chess 4.6. Here is how the game went, with some of my comments on the game.

White: D. N. L. Levy		Black: Chess 4.6
1.	P-Q4	N-KB3
2.	N-QB3	P-Q4
3.	B-N5	P-KR3
4.	BxN	KPxB
5.	P-K4	PxP
6.	NxP	

It is now like an Exchange Variation of the Ruy Lopez (1. P-K4, P-K4 2. N-KB3, N-QB3 3. B-N5, P-QR3 4. BxN, QPxB 5. P-Q4, PxP 6. NxP etc.) only here White's 4-3 majority is on the Q-side, so Black's pawns are more of a menace to White's king if he castles K-side; there is less piece protection to the White King on the Q-side.

	...	N-B3
7.	P-QB3	Q-K2
8.	Q-K2	B-K3
9.	N-B5	B-Q4

An active move, indirectly protecting the QNP. Black is not wasting any time putting the two bishops to work.

10.	O-O-O	QxQ
11.	NxQ	BxN
12.	PxB	BxRP

A sound pawn snatch. Black is not behind in development and the pawn formation was already balanced. Unlike Spassky-Fischer, Game 1, 1972. Black's bishop is in no danger.

13.	N-Q4	NxN
14.	RxN	O-O
15.	R-Q7	QR-B1
16.	P-QB4	

This is an unsound attempt to trap a bishop that cannot be trapped. White's bishop is hemmed in and his pawns are just weakened. Much more to the point is 16. P-B6 taking advantage of White's only trump — the rook on the 7th. Then if 16 ... PxP, or P-QN3, 17. B-R6. Notice how that motif is destroyed by the move played.

	...	B-N6
17.	K-Q2	KR-K1
18.	B-Q3	B-R5
19.	R-Q4	B-B3
20.	P-B3	R-K4

Black now has a positional advantage in addition to an extra pawn. White's bishop has become distinctly bad with many pawns potentially fixed on its colour.

21.	P-QN4	R-N4
22.	B-B1	P-QR4

A superb lever. Just what is needed to destroy White's Q-side pawns or create a passed pawn. The question: "Is Black's forthcoming passivity only temporary?" needs to be answered.

23.	P-R4	

If 23. P-B4 instead, then 23 ... R-N5 and ... P-KN4. But as played, Black's rook is only driven back to a better square and White has further weakened himself.

	...	R-K4
24.	P-N5	B-K1
25.	R-Q5	R-K2! (see Fig. 1)

Superbly handled. Who says Chess 4.6 is only a tactician? This fine move is multi-purpose. White now has no answer to the positional/tactical stroke ... P-B3. The Black bishop can now get out *via* Q2. Black's activity will improve as he (it) gobbles the weak White pawns.

26.	R-Q4	P-B3
27.	P-N6	R-K4
28.	B-Q3	RxP
29.	R-K1	R-K4
30.	R/4-K4	

R-QR1 is better, avoiding trades, and with at least some hope of winning Black's QRP.

	...	RxR
31.	BxR	P-R5

This is premature. White should immediately pounce on the RP with 32. R-QR1.

32.	K-B3	B-Q2
33.	P-B5	P-R6
34.	P-N4	

Now it's too late for 34. R-QR1 i.e. 34 ... R-R1, 35. K-N3, B-K1 ch and ... P-R7.

	...	B-K3
35.	B-B5	BxB
36.	PxB	R-Q1
37.	R-QR1	

If 37. R-K7, R-QR1 etc.

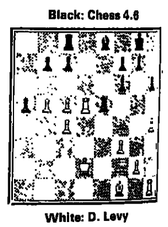
	...	R-Q4
38.	K-N4	RxP/KB4
39.	P-B4 ??	

What could be the point? But if 39. RxP, then R-B5 ch!

	...	RxP ch
40.	KxP	

If 40. K-R5, then ... R-QB5 and White is just about moveless.(!)

Black: Chess 4.6



White: D. Levy

Fig. 1: Chess 4.6 v D. Levy. In this position Chess 4.6 played 25 ... R-K2! Shall we call this a positional or tactical ploy? White is defenceless against P-B3 which will win more material.

40. K-N3 or B3, then ... RxP ch wins easily.)

	...	R-B5
41.	R-Q1	RxBP
42.	R-Q8 ch	K-R2
43.	R-Q7	R-R4 ch
44.	K-N4	R-QN4 ch
45.	K-B4	RxP
46.	RxBP	K-N3
47.	R-Q7	P-KB4
48.	Resigns.	

To sum up. Rather than calling Chess 4.6 positional or tactical, I would call it an "impressive materialistic player". Here the human Master was given a pawn-structure and end-game lesson. We must recognise that it was a simultaneous game, and that Levy may have been very tired.

The reader must not jump to the conclusion that Levy thereby lost his celebrated bet which specifies full match-play conditions. But it would not surprise me if some bookies were now to shorten their odds for side-bets!

Expanding operations

HAVING based its early activity on selling Diablo printers and terminals, Zygal Dynamics, of Chesham, is now expanding its operations by taking on the exclusive distributorship for Zentek Intelligent VDUs and also distributing DPS Datamaster data storage and editing units.

Formerly held in this country by CMC, the Zentek Trancribe calls for Zygal to take over a million worth of terminals over a five year period. Each terminal is based on the Intel single processor backed up by 64 bytes of read/write memory.

Zygal intends to develop software for certain applications and will also offer a service there in addition to the ... to meet specific requirements.

COMPUTER WEEKLY

presents a special one-day conference

Solving the computer staff problem

The Cafe Royal, Regent Street, London
Thursday, January 19th, 1978

Objectives:
To provide DP Managers and Personnel Officers of firms using computers with an overview of current practice in the recruitment of computer staff.

Shortage of computer staff is a problem which faces all computer users. A lack of qualified personnel is exacerbated by the mobility of computer people and their apparent loyalty to the job rather than the organisation.

In these circumstances recruiting suitable staff poses particular problems: How does the user set out to attract staff? How does he advertise effectively? How does he manage the selection process? Should he use a recruitment agency? Is the use of contract staff a viable solution?

The seminar will seek to answer these questions and to indicate what the computer user should do in order to formulate a successful recruitment policy.

Session 1
Introduction: The computer scene and computer people. Who are they? What are their characteristics? How are they motivated? Can supply ever catch up with demand?

Session 2:
The user's viewpoint. Finding a way through the recruitment jungle. How can the computer user act effectively to obtain the staff he needs? How should he set about recruiting staff? What are the pitfalls? Planning staff recruitment and development rather than reacting to crisis situations

Session 3:
The role of the recruitment agency: Identifying users staff requirements. Specifying the post. Drafting the advertisement. Vetting the candidates. Giving the user the benefit of specialist knowledge of the job market.

Session 4:
The NCC Job Selection Service. Systematic tests to assess applicants qualities can provide a standardised base for selection when compared with national norms — thus providing a useful aid in the selection process

Session 5:
How to advertise for computer staff. Specifying the job and the working environment. Writing the advertisement. Adopting a creative approach to job advertising. Media selection. Maximising response.

Session 6:
The DP Manager. Picking the right man for the most responsible job in the computer dept. Fewer in number than other categories of computer staff, good DP Managers are worth their weight in gold. The post demands a more generalist, less specialist approach than programming and systems analysis. Spotting those with potential requires a keen eye and a wide ranging knowledge of the business. Filling this key post is a task for a reputable recruitment bureau.

Session 7:
Contract Staff. Increasingly contract staff are being used to overcome work bottlenecks, help in conversion programmes, etc, as well as compensating for variations in staff availability due to holidays and sickness. Now the use of contract staff is such a well-established feature of the computer scene that it merits inclusion in an overall appraisal of the recruitment problem.

Session 8:
Maintaining standards in the recruitment business. The CSA has established a recruitment division. What are its aims and achievements? A consideration of the code of conduct.

The speakers will include Tony Millor of Furness Withy, David Payne of Tesco, John Wood of EMS, George Penney of the NCC, John Goldsmith, Ian Humphries of Knight Computer Services and Neville John of OCC, chairman of the CSA Recruitment Division

Please reserve . place(s) at the "Solving the computer staff problem" conference to be held at the Cafe Royal, London W1, on Thursday, January 19th, 1978.
The fee is £55.00 plus 8% VAT (£4.40). Invoice will be sent.
Please send confirmation of booking to (CAPITALS please):

Mr/Mrs/Miss .....
Company .....
Address .....
.....
Telephone .....

Please return coupon to:
Conference Administrator
IPC Business & Industrial Training Ltd
Surrey House
Throwley Way
Sutton
Surrey, SM1 4QQ
Telephone 01-643 8040

How did you get your job?

People find jobs in many ways. They see a position advertised in a newspaper; they hear about a job from a friend or "on the grapevine"; or promotion is offered. Computer staff are luckier than most because they can often choose a job to suit their personal requirements at any particular time. However, most people take jobs that involve the least disturbance to their home life, and if they do move it is usually to a company within reasonable travelling distance. Computer Weekly is carrying out a survey of the way in which people find jobs, with special reference to use of recruitment companies. Readers who wish to take part in this survey should answer all the questions in the questionnaire below and return it as soon as possible to: Job Survey, Computer Weekly, Dorset House, Stamford Street, London SE1. Those readers who are willing to participate in a follow-up to help with an analysis of replies should add their name and address. All information received in this survey is strictly confidential and will not be released by Computer Weekly to any third party.

1. How many jobs, with different employers, have you had in the last five years? .....

2. How many of these jobs were obtained from:
   (a) An advertisement by your present employer in the trade press? .....
   (b) An advertisement by your present employer in the national press? .....
   (c) A recruitment company? .....
   (d) Other? .....

3. Have you ever used a recruitment company? .....

4. If NO would you use a recruitment company in the future? .....

5. If you have never used a recruitment company — why? .....
   If you would not use a recruitment company again — why? .....

6. If you have used a recruitment company
   (a) Did the company specialise in DP or general vacancies? .....
   (b) Do you prefer specialist DP or general recruitment companies? .....
   (c) Do you prefer to reply directly to an employer or via a third party, such as a recruitment company? .....

7. If you used a recruitment company indicate the quality of the service provided in the following areas. Please state opinion for each category.

	Good	Bad	Indifferent
(a) Well informed on a specific company/job advertised			
(b) Wider choice of jobs available			
(c) Availability of impartial advice on jobs			
(d) Easy access to relevant job opportunities			
(e) Provision of objective and sound career guidance			
(f) Confidentiality of personal information			
(g) General attitude and standard of service			

8. In what areas would you like to see improvements in the service provided by recruitment by recruitment consultants? .....

9. What is your current job title? .....

10. Where do you live (town/country)? .....

Please add name and address if you wish to take part in a follow-up inquiry:

NAME .....

ADDRESS .....
.....

Computer Marketing
Working with and supported by British manufacturers.

Newbury Labs low cost British made VDU. 7001/2 teletype replacement. 7004/5 sophisticated VDU with block mode trans. Full cursor control, data protect and highlighting. Delivery now from 6/8 weeks. Prices from £575

MSI low cost British made range of cassette data recorders. Teletype compatible. High speed (2400 B.P.S.) Standard serial interfaces. Remote operation. Prices from £432

Midlectron 22 low cost British made Paper Tape Reader Punch. Reads to 150 C.P.S. Punches to 50 C.P.S. standard serial interfaces. 5, 6, 8 level operation. Prices from £932

Computer Marketing EX800 low cost high speed electro sensitive printer. 80, 40 or 20 characters per line. Upper and lower case. Up to 160 C.P.S. standard serial interfaces. Prices from £699
Ex810 model 512 x 16 dot per sec. plotter.

Digital LA36 DECwriter 30 C.P.S. KSR printer terminal. Ex Stock Prices from £965
Full range of DIGITAL high speed printing terminals available

New ASR LA36 DECwriter incorporating M22 reader punch. Prices from £1886

Digital LSI-11 processor modules, systems and peripherals. Full range available Ex Stock. Less than manufacturers R.R.P. All prices exclusive of VAT and one off end user.

Computer Marketing,
641 London Road, West Thurrock, Essex.
Tel: (04026) 3010 Telex: 896786

FINDING THE RIGHT STAFF

If you are responsible for recruiting computer staff and have come to the conclusion that there is no easy solution to the problem of finding suitable people, you are undoubtedly right.

There is no easy solution. But, depending upon the way in which you tackle the recruitment problem, there are some approaches which will prove more effective than others.

A Computer Weekly seminar, entitled "Solving the Computer Staff Problem," aims to show how this can be achieved. While not attempting to provide a facile solution, it will nevertheless indicate how the computer user can set out to formulate a more positive recruitment policy.

The seminar, which is being held on Thursday, January 19, 1978, at the Cafe Royal, London, kicks off with an examination of the current recruitment scene, paying particular attention to computer people and their motivation. Having set the scene the next session will look at the problem from the user's viewpoint, with David Payne, a personnel officer with Tesco, explaining how his company gets to grips with the staff problem.

Then two senior executives from different types of organisations — a recruitment bureau and an advertising agency — will explain how the user can make the most of the services they offer.

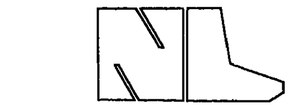
A session by George Penney of the National Computing Centre, will outline the facilities offered by the NCC Job Selection Service which uses systematic tests to assess applicants' qualities and to compare them with national norms.

A special session will be devoted to the key job in any computer installation, that of the DP manager. John Goldsmith, the well-known recruitment consultant, will look at the problem of picking the right man for the job, and will ask whether there is an adequate career structure for DPMs.

The increasing use of contract staff, not just to overcome work bottlenecks or to help when peak workloads occur, but also as a more permanent feature of the job scene, will be examined by Ian Humphries of Knight Computer Staff.

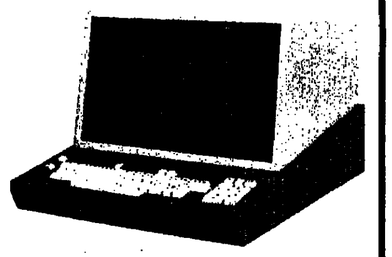
Finally, a group which is trying to bring some order to what is in some ways a chaotic situation will explain its aims and achievements. Neville John of OCC, chairman of the CSA Recruitment Division will review the division's code of conduct, indicating how standards are being established.

The staff problem will be with us just as much in 1978 as it has been in 1977. Those who wish to start the New Year on a positive note should find out more about the seminar by contacting Chris Hipwell, Room 126, Dorset House, Stamford Street, London SE1 9LU. Tel: 01-261 5735.



VISUAL DISPLAY TERMINALS

Models 7001/7002



★ British Design and Manufacture
★ Model 7004 (64 Char. Set), Model 7005 (96 Char. Set)
★ 24 lines of 80 characters per line
★ Switchable baud rate from 75 to 9,600
★ Dual Interface — CCITT V24 and 20/60 mA current loop
★ XY Cursor Address
★ Protected Field Format, Blink and Inverse Video
★ Roll or page mode
★ Video output for External Monitors
★ Hard Copy Print out by line or page

Models 7001/7002

★ British Design and Manufacture
★ Low Cost
★ Teletype Compatible
★ 24 lines of 80 characters per line
★ 24 lines of 80 characters per line
★ Switchable baud rate from 75 to 9,600
★ Dual Interface — CCITT V24 and 20/60 mA current loop
★ Hard Copy Print out
★ Switchable half/full Duplex
★ Video output for External Monitors

NEWBURY LABORATORIES LIMITED
KING STREET, ODIHAM, HAMPSHIRE RG25 1NN
Telephone: 026 671 2810. Telex 858815

Systime on way to No 2 position in UK

By John Kavanagh

AT the end of last year Systime predicted that in 1978 it would become the UK's second biggest computer manufacturer. At the time that looked a rash statement made in a state of euphoria by a company which had just increased its turnover by almost five times in three years. After all, the turnover was still less than £3 million and the company had been building systems for less than a year.

Almost a year later Systime stands by that prediction, and well it might. For turnover this year is up to £4.5 million, the National Enterprise Board has bought a 26% stake in the company, giving it £260,000 immediately and £700,000 to support development over the next three years, and planned moves into Holland and Germany are expected to help boost turnover to £10 or £11 million during 1977-78 and to £12 or £14 million the year after.

The term "computer manufacturer" needs qualification, perhaps. Of the 15 to 20 circuit boards in a Systime series 5000 for example, only two, the Digital Equipment PDP-11/04 and 11/34 processor boards, are not designed and put together by Systime. All the others — memory boards, interfaces and peripheral controllers — are designed, assembled and tested at Systime's factory in Leeds using UK-made components.

"Can you say that this is not a Systime computer?" asks Nick Willard, marketing manager. "We could make the processor boards tomorrow, but who wants to get involved in developing operating systems? Besides the PDP-11 is still the best minicomputer around. It's so versatile, and DEC keeps it up to date."

Systime also builds its own display terminals from basic nuts and bolts and sells them as products in their own right.

And even the processor and peripheral cabinets and chassis, storage bins and tables for terminals are bashed out of sheet metal in the company's own factory. This work was contracted out to a three-man company, but Systime bought that company last year and it has since expanded to nine people and will expand further to 20 by the end of next year.

Systime buys in peripherals, trying as far as possible to use UK sources. This means that

Gow

Data Recording Instrument supplies matrix printers and cartridge disc drives. Faster printers and bigger disc units come from Control Data and Memorex, but Systime says that 80% by value of the components of its systems are made in the UK.

Systime is now in the middle of a massive expansion which really began towards the end of 1975 with an order worth over £3 million from British Leyland for series 5000 systems for its distributors (CW, December 18, 1975). Willard describes that order as the first big breakthrough and also mentions another big order for the series 3000 from Littlewoods for word processing (CW, May 13, 1976).

During 1976 Systime brought its assembly work in-house. By the end of September last year staff numbered 147, and by September this year, the figure was 225, and in a year's time it is expected to be 340.

The factory is being expanded on all three floors and a big research and development laboratory is waiting to be fitted out.

Last year the company added Birmingham, Bristol, Glasgow and Leicester to its network of offices which was previously limited to London, Manchester and the headquarters in Leeds. It also moved into Holland through an agreement with a software house in The Hague, called Multi-function, which takes three systems a month.

The National Enterprise Board's investment is giving the company the financial strength to form subsidiaries in Holland and Germany, and it expects to attack the Belgian market from its Holland base.

Systime has also moved into the OEM market in the last year and between 25 and 30% of its output goes to systems builders.

Systime is staying level headed about all this expansion. "We could have grown faster, but we've chosen not to," says the chairman, John Parkinson. "And when you have the chance of growing faster than is good both for you and the customers, it is hard to exercise self-restraint. But we want to build up a company which will offer the same service with a turnover of £16 million as it did with a turnover of £2.8 million."

There are, at present, about 230 Systime computers installed. Parkinson estimates that about 60% are series 1000s, 25% are 5000s and the rest are 3000s. The company has just announced the 6000 at the top of the range and expects to install six during the current financial year.

Many of the users have matured from first time user to experienced people. "We're getting into more sophisticated areas now," says Parkinson. "Our first installations are now upgrading their systems. We have five users who have systems linked together and there are likely to be more as our users get more experienced."

What effect has belonging to the National Enterprise Board's Insac Data Systems had on the running of the company? "We've had no interference at all," says Parkinson. "The NEB undertakes not to get involved in the day-to-day running. There's a small restriction, that is a ceiling on the company's total borrowing of 3½ times the reserve and share capital. That gives us a borrowing potential of £1.8 million.

"As far as the £700,000 is concerned we prepare an annual operating plan and a five-year plan, and we can draw on the money to carry out the plan. This year's plan was approved by the NEB with no amendments."

Parkinson

Managing director, John Gow, is impressed with Insac. "They're very keen to learn," he says, "and very quick to react. You can get a decision in principle on something in three hours: it doesn't have to go through endless committees. And the chairman is easy to get to."

It was Gow who started Systime seven years ago. He was doing software support for DEC in the north of England in the days when minicomputers were regarded as nothing more than scientific machines. Gow formed Systime mainly as a commercial software company. He was joined in 1972 by Dr Ian Fellows, an Englishman who had research and development possibilities at DEC in the Netherlands. He brought the first new development expertise and the first Systime was designing its own electronics. Since then the engineering staff has grown to company has

THE systems available from Systime start with the series 1000, which is built around the Digital Equipment PDP-11/04 processor. Prices start at £18,500, and the system can support up to 9.6 Megabytes of disc storage, a 150 characters per second matrix printer and three display terminals.

The series 3000, also based on the PDP-11/04, starts at £19,500. This system can have up to 256K bytes of memory, 1,600 Megabytes on disc, a 600 lines per minute printer, eight tape drives and eight terminals.

The series 5000, based on the PDP-11/34, starts at £26,500. Its disc capacity is eight 80 Megabyte drives and it can serve four line printers and eight tape drives.

For just over £60,000 the user can get a series 6000 with 128K of memory, 80 Megabytes on disc, a 400 lpm printer and six display terminals.

The new series 6000 is based on the PDP-11/80 and can support 50 terminals. Prices start at £100,000, and Systime expects this system to compete with machines up to the power of an IBM 370/138 and 370/148, offering a competitive throughput at much lower cost.

Software packages available include sales ledger, purchase ledger, nominal ledger and payroll.

Systime also has an integrated stock control system, with ledger, order entry and parts explosion systems built-in.

MICROSYSTEMS'78
MICROSYSTEMS'78
MICROSYSTEMS'78

SEMINAR & EXHIBITION
West Centre Hotel, London
February 8 · 9 · 10 1978
Sponsored and organised by IPC Business Press

Electronics Weekly
COMPUTER WEEKLY data processing
microprocessors
Electrical Times ELECTRON
electrical review wireless world

I am interested in Microsystems '78.
☐ Please send me details of the seminar programme, when finalised.
☐ I would like to submit a paper to be delivered at Microsystems '78.
☐ My company is interested in participating in Microsystems '78 as an exhibitor.
☐ My company would like to make an industry presentation at Microsystems '78.
(Please tick the appropriate box)
Name
Job Title
Company Name
Company Adress
Please return this coupon to Chris Howell, Room 126 Dorset House, Stamford Street, London SE1 9LU

LETTERS

Games DP people play

I AM collecting details of computer games, interesting computer-produced pictures, etc, for a forthcoming book entitled "Directory of Computer Games". Your readers are invited to send the following details of computer games they have written, for inclusion in the directory:

1. Name of the game.
2. Synopsis of the game.
3. Programming language used.
4. Input media.
5. Machine used (core size, peripherals, operating system).
6. Any other relevant details.
7. Author's name and address.
8. Approximate price (if any).

Needless to say, all entries will be free, and the intention is that prospective buyers of games will contact the authors directly.

MICHAEL SCOTT
9 Elgar House,
Fairfax Road,
London NW6 4EX.

Courses for workhorses?

I READ, but with not much interest, the article on computer education by Mr Roy Atherton (CW, November 17).

Like most academics, he misses the whole point about computer education. What is needed is not training in computers, but education in data processing. Most people will come into computers in industry, government and public services where the computer is primarily used for data storage and file handling.

What should be taught in schools, and what people should be made aware of, are basic problems such as the storage and classification of data, the use of codes and keys, and the different access methods to files which are available.

All these problems have been, and are, encountered in any system whether it be manual, part mechanised, or computer.

There are countless examples and case studies to illustrate the points, eg the way school records are kept, or further afield, how the records at the licensing authority at Swansea are organised. Education of this sort would go a long way towards dispelling the quaint belief that terms such as "access method", "file", "update" and "back up" are peculiar to computers.

Such an approach would require no hardware and would be far more profitable than teaching binary arithmetic or a programming language like Basic which has little relevance in business generally.

C. BRITTAIN
Group Systems Manager
Brockhouse Ltd
West Bromwich

THE EDITOR welcomes letters commenting on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication.

Micro-mania plea: No whizz-kiddery

I HAVE been reading Ivor Catt's article on microprocessors (CW, November 3). No, I'm not a very slow reader — just very busy!

I'm not sure, at the end of it, whether he is simply arguing for better designed micros or whether he is arguing for some altogether other approach.

His piece is so immensely readable in destructive mode. Could he (and CW) be prevailed upon to give us the other side of the coin, i.e. prescriptive mode?

As a simple-minded salesman, who is daily reminded that all the customer really wants to do is to solve his problems without whiz-kiddery getting in the way, I would dearly love to be told what it is that Mr Catt sees we could really be offering the customer if we got the act right.

I have a gut-feeling that his strictures against the micro-mania are probably right, but not being the technologist, merely a horny-handed commercial pragmatist, I am in no position to shout too loudly. But if Mr Catt (and others like him) who are technically competent could show the way, then I (and others like me, not to mention the precious, money-paying customer) would create the right market demand.

BERNIE GREEN
Sales Director
Gamma Associates Ltd
Nottingham

When comparison becomes odious

ALTHOUGH my company is sometimes in direct competition with ICL, I fail to understand and appreciate why the headline "1907 was 100 times faster than a 2970" (CW, November 3), should appear on your front page.

I must congratulate Professor David Barron on producing such definitive results and diagnosis on the comparative performance of the two machines. However I think he would serve British industry, especially ICL, by helping them to solve any problems that he might have found rather than be seeking to appear on "What the papers say".

Manufacturers set up user groups where problems such as performance can be discussed and the sadly disappearing act of co-operation between supplier and customer can survive.

As Geoffrey Reeves stated, "... things are getting better". I am sure if customers like Professor Barron channelled more of their energy into assisting ICL instead of "knocking" and getting front page publicity, things will get better more rapidly, and the British computer industry will find it easier to beat off foreign competition.

JOHN STEVENS
Tring,
Herts.

Option for teachers

IT is with good reason that Mr Andrew Parfitt comments that it is difficult for the teacher with little experience of computing to cope with CSE and "O" level courses (CW, November 17).

He, and others facing this problem, may be interested to know that we have been running courses at this college to meet this need for six years. This year, we are including an option for experienced teachers to enable them to cope with the formidable "A" level courses in Computer Science. The course is held in June, and is "poolable", which means that the cost to the local education authority is minimal.

I should be pleased to provide further information to anyone interested.

GWYN JONES
Kelsterton College,
Connah's Quay, Clwyd.

Painless update guide

BUSY data processing professionals who want to update themselves fairly painlessly on what has happened in the computer industry over the past year should find the computer Industry Annual Review 1977/78* useful reading.

The 80-page publication includes a five-page rundown of most of the important product developments and projects in each of the main sectors of the industry — mainframes, minicomputers, small business systems, data communications and services. Stress is placed on the continuing dominance of IBM and the ways in which it is reacting to threats to its existing markets and opening up new ones.

Facts and figures on major company developments during the year are presented in a six-page section which contains details of financial results, takeovers, reorganisations, agreements, new companies and legal wrangles.

There is also a guide to more than 50 suppliers of computer systems operating in the UK, listing the name, address and telephone number of each firm.

***Computer Industry Annual Review 1977/78**, 80 pp. £2. Welker-Ellis Ltd, 87 Great Eastern Street, London, EC2. Tel. 01-739 7049.

Association offers range of skills

AN ASSOCIATION of companies with expertise in services including software and data preparation, public relations, advertising, market research, staff recruitment and training has been formed to serve computer bureaux and software and hardware suppliers.

The association is co-ordinated by Sales and Marketing Services, a small operation headed by Alan Williams, who has 22 years' marketing experience, including spells with Unilever, IBM and University Computing Co.

"We want to become the Mr Fixit of the computer industry," said Williams. "I'm a great believer in expertise and the association brings together more expertise than I could set up with any amount of money. The eight companies in the association have a total of 80 staff."

Explaining the need for the association, Williams said, "When I was at UCC there was nowhere I could find the sort of services we're offering. There are very few companies, for example, doing market research for, or offering good public relations services to, the computer industry. It's a struggle to find where they are."

Although the companies in the association do business with end user companies, the association is concentrating on suppliers only. Sales and Marketing Services has offices in London and the Midlands and most of the associate companies have offices both in London and outside. Alan Williams can be reached at Wheelwright's House, Pipe Ridware, Rugeley, Staffordshire WS15 3QL. Telephone 088922 281. The London telephone number is 01-248 5666.

DEC complex

MOST of Digital Equipment's operations at Reading are to be centralised at a new 260,000 square foot manufacturing and administrative complex on the south side of the town. It will house most of the personnel currently occupying six separate premises and should be completed by 1979. DEC has applied for outline planning permission and building should start in a few months' time.

First edition

pocket sized

Something unforgetable has happened to DEC's LSI-11 and *PDP 11/03 computers.

It's the new Intel In-1611 Add In Memory system.

Featuring a standard 2 wide printed circuit card up to eight times more dense than DEC's own memory system, the In-1611 represents a real advance in design and economy.

Available ex-stock from Rapid Recall, the In-1611 is available in 8, 16, 24 and 32K models – all with access times of less than 450 nanoseconds. And all units are directly compatible with the DEC systems.

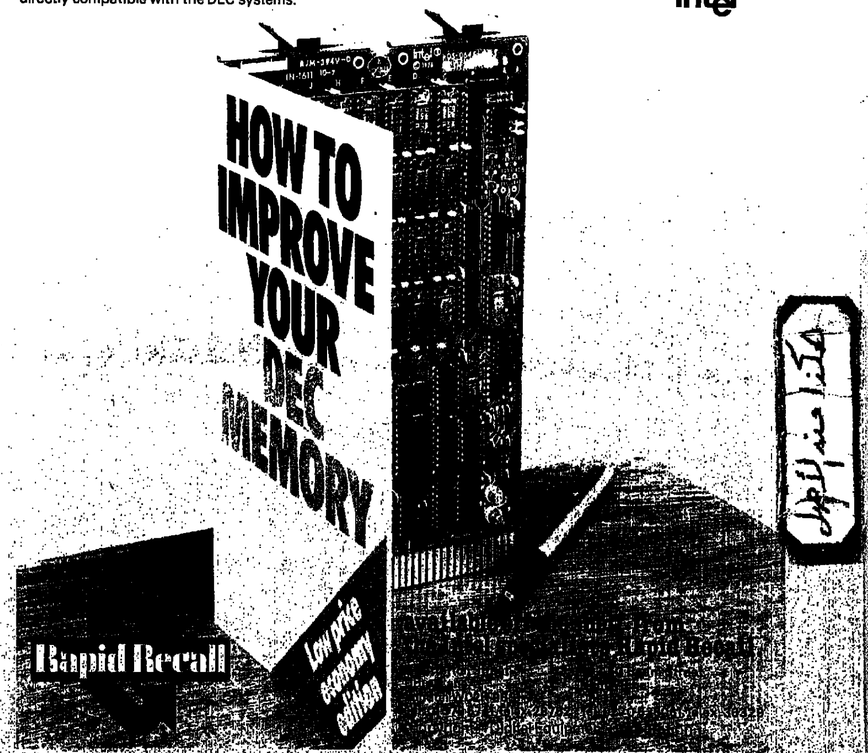
For immediate off the shelf delivery of any In-1611 unit – or for more information get in touch with Rapid Recall (tel: 01 379 6741).

Also available – In-4711 series.

This plug-in memory module provides 16K words plus parity on a single card and occupies only a single *PDP-11 card slot. The In-4711 can be used with the *PDP-11/04, 11/05, 11/10, 11/34, 11/35, 11/40, 11/45 and 11/50.

The new Intel In-1611 Add In Memory.

intel



Putting computer power where work is

Anthony Bristow, marketing vice-president at CMC, describes a typical distributed computing application to show the benefits of this method, and also to highlight some of the technical considerations.

By Anthony Bristow

LARGE scale number crunching using unintelligent data capture services is an unflattering, though permissible, description of electronic data processing.

Even more unflattering, though, because it's unanswerable, is the computer-knocking remark that centralised data processing departments fail to mirror their own company's organisational structure and that, in fact, long established routines have to change their operations, schedules and attitudes when a computer appears on the premises.

Distributed processing, on the other hand, puts computer power where the work is. And how to get the power of a central processing system to decentralised business locations has long exercised the skill and imagination of a significant section of the computer industry.

What has "done the trick", as so often when our industry takes a major jump ahead, is a massive cost cutting of components paralleled by significant developments in miniaturisation. In the context of distributed processing, the production of maxi-powered microcomputers so cheaply that they can be stuffed into terminals without greatly altering the price of these ubiquitous bits of hardware has transformed the latter into "intelligent devices".

Distributed processing, which is largely concerned with the use of widely scattered intelligent terminals, can thus provide remote locations with a share of computer power proportional to their needs whenever required.

Obviously, centralised DP structures painstakingly constructed over several years, operating successfully and demonstrating real cost cutting abilities are in little danger of an imminent revamp. But there are organisations which are certainly suitable cases for distributed processing treatment: where costs and turnround are too high, and responsiveness, local flexibility and security too low.

High costs frequently occur when dumb terminals are online all day, on several lines, to a mainframe. Long turnrounds are often associated with the physical transport of documents from remote to centralised locations, for processing, and back again.

Poor responsiveness sometimes results from the need to access main files at the central location in batch mode. Flexibility is impaired by having no inquiry or analysis features at the remote end and security is at risk if activities at the remote location depend on central computer facilities, and associated telephone lines, being in service every minute of the day.

Let's look at a typical sales order entry application to illustrate the potential benefits of a distributed data entry and processing approach.

Presume the branch office takes orders from customers and satisfies those orders from stock, held in the branch. Orders taken in a manual system, whether by telephone or by letter, will be transcribed on to standard forms on which will be recorded all relevant details. Some of these details — like the customer's name, order number, quantity and type of product ordered — will be submitted by the customer. Other information — such as the delivery and invoice address, payment terms, product description and discount — will be obtained from local references held, presumably, in some kind of filing system. Typically the product movement to which I have referred will only be triggered when all this information has been assembled and written down on a multipart order set.

Now all this can take place quite happily without any intervention or participation of the company's computer system, which comes into the act when one part of the order set goes to the central location for punching and preparation as management information. However, the transaction has taken place without a great deal of checking as to the accuracy of the information and it has taken place with a good deal of research and manual looking-up of facts and figures.

A distributed processing system on the other hand, can, at the order-taking point, remove a great deal of clerical activity and risk of inaccuracy. Furthermore, it can provide stock level information, so that an order-taking clerk previously involved in writing a multipart set and consulting a number of reference documents, can go to a distributed processing terminal, key in a customer number and have displayed automatically, delivery and invoice addresses, payment terms and credit ratings. Equally when she enters a line item, she keys in the product code, and the price and description appear on the screen, together with the stock position, and the sales ledger and stock files are updated.

The benefit of all this is, of course, not just sheer productivity. The customer details are known to be absolutely right, his discount and credit ratings are consulted and applied, the product is correctly identified and priced, and the stock availability is apparent. A picking list can be generated locally for use in the warehouse and the delivery note and invoice can be printed at the place of work.

Other significant improvements are that the transaction is recorded and, usually, transmitted to the central computer site at the end of the day. Also, at the end of the day, a branch activity summary can be printed for local management.

The same system can be used at the time the movement actually takes place when, for example, a consignment leaves the warehouse.

For anyone considering which part of an existing manual system is to receive computer assistance, consideration should primarily be given to replacing the area responsible for most errors, since one of the principal advantages of an intelligent terminal system is weeding out mistakes before they are transmitted to mainframe.

Another important consideration is the number of transcription stages in an existing manual system. Every transcription process takes time and effort, it therefore costs money and introduces the possibility of further errors. So, a one-shot capture of data leading to the provision of operational documents will be beneficial.

There is always a need for some inquiry procedures at branch order offices. If the distributed system holds files relevant to a particular branch, expensive online inquiry facilities to mainframe, perhaps hundreds of miles away, are quite unnecessary.

Since distributed data entry and processing is a new technique there are few standards and even fewer general principles of system design. Further complicating the picture is the self-tailored nature of nearly all user/system applications.

However, there are a few basic check-list questions which can help avoid some of the pitfalls. Firstly, what data needs to be transmitted between the remote intelligent terminals and the host mainframe computer? Distributed processing economics is based on the idea that the remote terminal can process and store locally much of the data that, in the past, had to be sent to the mainframe for processing and storage. The more data that can be stripped off and handled locally, the riper a particular remote location is for distributed data entry and processing.

Secondly, what is likely to be the total message transmission time and the volume of data for transmission? Batch mode transmissions are far more cost effective in terms of cost per character transmitted and also allow much easier scheduling of the mainframe communication facilities to support them.

Thirdly, who will control the distributed system? Is it to be the central DP manager or the boss at the remote location? A combination of diplomacy and rational discussion suggests that the DPM must remain in overall control. However, there must be some degree of local control, simply to take advantage of local terminal programming capability. Perhaps field personnel should be allowed to write their own local application programs under close supervision from the DPM to assure standards, effective control and system integrity. I believe that most branch managers will be only too pleased to go along with what the central DPM is providing for the branches' exclusive use.

So a distributed processing system should be regarded as an extension to the group's overall facilities. For acceptance and effectiveness the system must match the profile of branch operations and be easily identified by remote location staff as a helpful tool in their day-to-day work.

"The best organisation to implement user applications is the user company itself. Total dependence on the equipment manufacturer for such applications can lead to extended implementation times."

The main interface between the system and operational staff is most likely to be a VDU terminal. What appears on the screen is of crucial importance to the success of the system and it is not always the case that the screen should contain the maximum possible amount of information.

The system will usually incorporate a printer, or printers. Are the printers of an appropriate speed and, furthermore, do the printers have sufficient advanced features to make best use of that speed, such as fast skipping, bi-directional printing and so on? Will the printer be easily adaptable to use existing stationery? Does it have suitable format control and can it even be used to print in compressed characters for certain documents, both to match existing paperwork and also to save paper costs?

Moreover, it may sometimes be necessary to have more than one printer on the system so that, for example, two types of print-out can be made at the same time. Perhaps an invoice on one printer, the picking list on another. Is the local mass storage medium, usually disc, large enough to hold the data that will accumulate during the day and also large enough to hold the various reference files that will be needed? A combination of customer and product files can easily run into a million characters of storage.

Data exchange between the distributed system and the central mainframe will normally be by communications runs in batch mode and over modems and Post Office lines. In selecting the speed of communications equipment one needs to ensure a balance between the peripheral speed capability at the distributed end and the overall time elapsed at the central end to communicate with all distributed locations. As a useful alternative to communications direct to mainframe, the distributed processing system can communicate with a similar system installed alongside the mainframe or with, perhaps, a key-to-disc system being used for central data preparation and which can have synchronous communications equipment fitted.

It is now possible to provide distributed systems so compact that 10 Megabytes of disc, 64k bytes of memory and a power processor are all in the space occupied by a standard two-drawer filing cabinet.

Software requirements of the system clearly demand some element of programmability and there are probably three subdivisions.

Firstly, there is the need for simple formatting of layouts and field descriptions, most easily accomplished by means of a set of parameters inserted into "fill-in-the-boxes" layout sheets.

Secondly, there is a need for programmability of checks to take place in real time during terminal operations.

Finally, there is the need for programmability on a batch basis, so that the distributed system can run analysis and summary programs for use by branch managment concurrently with terminal operations.

The best organisation to implement user applications is the user company itself. Total dependence on the equipment manufacturer for such applications can lead to extended implementation times. There is also the danger of inflexibility in both initial specification, and ability to respond to the organisation's later requirements. So in most distributed system cases I believe that user organisations represented by the central management services group will assume responsibility for implementing a system to assure that group standards are maintained throughout the organisation and that all applications are compatible with central management information suite.

Where can I find new offices at rents from £1·50 p.s.f. within 75 mins. by train from London

- City Centre Location
- Easy Motorway access
- Multi-storey car park adjoining
- Fully carpeted

Grimley & son
CHARTERED SURVEYORS
St Philip's Place
Birmingham B3 2QQ
021-236 8236

Edward Erdman
6 Grosvenor Street London W1X 0AD
01-629 8191

ROK
Robinson Osborne & Moules
153-161 New Union Street
Coventry CV1 2PL
0203 57321

Spanish electricity chiefs came to this country to see a computer system in action similar to one they hope to buy . . . at High Speed Gas. Signors José Vila (third left) and Ramon Baranera (second left), from one of Barcelona's three electricity companies, spent two days with the East Midlands gas board at Leicester. Also in the picture is interpreter Signor Joseph Ribot (first left), computer services manager Roger Trewin (right) demonstrating a VDU and the computer department manager John Beetham.

How Varian will be integrated into Univac's mini operations

KEY decisions have now been taken on integrating the former Varian Data Machines, now Univac Mini Computer Operations, into the company's overall structure.

The division, known as MCO, will continue to be a separate element within Univac, with its own identifiable management chain, so that Univac can assess its performance and satisfy itself that the objectives served by its purchase are being met.

"However the V77 product line has just been released to Univac mainframe salesmen," Ronnie Colvin, MCO marketing, planning and support director for International Division told Computer Weekly.

"We believe in account continuity, with one salesman responsible for the whole of the customer's system, and one of the reasons for buying MCO was to ward off attacks on the Univac base from the minimakers.

"In general we are talking about add-on sales to 1100 and 90 series users, but there are cases where we can hold on to a 9000 series user who might otherwise be lost to another minimaker."

There was no question of MCO losing its identity as a traditional minimaker in the same mould as Hewlett-Packard, DEC or Data General — "because that would defeat the object of the acquisition, that of keeping Univac fully competitive within the whole market spectrum," said Colvin.

Univac bought MCO for three reasons, according to Colvin.

"The first was of course to protect the Univac base, the second was to attack other people's bases which appear to us to be vulnerable, and the third was that the company was intrigued at the success and stability of the three leading minimakers."

"We have specialised minicomputer sales forces in seven countries — the UK, France, Germany, Italy, Belgium, Holland and Australia; the Scandinavian plans are uncertain because of our relationship with Saab-Scania there whose Datasaab company also builds minis."

The market areas being attacked by MCO have changed little from those sought by Varian: they include the OEM systems builder, experienced DP users who are perhaps entering their third five-year DP plan, and a range of specialised applications markets.

These include banking, in particular communications applications such as the terminal network being implemented for Clydesdale Bank in Scotland. A major contract has also been fulfilled at the First National Bank of Chicago, where a Swift implementation and other banking applications are running on V-series minis.

Manufacturing, including factory data collection and process control, is another area of interest, and Varian's acquisition of the German Krantz Computer shortly before Univac bought Varian, has given the company an entrée into the printing and publishing automation market.

The Krantz Mulby line of minis has now been abandoned, and the Krantz plant at Aachen and the Varian plant at Walton-on-Thames become in effect internal systems houses for MCO, with small amounts of systems assembly being done at each.

"Each will operate autonomously as a systems house," said Colvin.

'No access to NHS records', MPs told

INDIVIDUALS will not have the right to access information on their medical history stored on National Health Service computers. In the Commons last week the Health Minister Roland Moyle said the decision on access was a matter in which the doctor concerned would exercise his professional judgment and not one in which it would be appropriate for the government to intervene.

Moyle (Lab, Lewisham E) was answering a question from Conservative MP Andrew Bowden (Brighton, Kemptown), a supporter of the freedom of information campaign which is calling on the government to make all information generally available.

Moyle's answer endorsed the view expressed in the government White Paper on computers and privacy which said that a doctor may not always consider it to be in the patient's best interest to see the information.

Bowden said he wanted the Department of Health and Social Security to discuss with the British Medical Association the need for guidelines for doctors on the confidentiality of medical records.

He said computers had a valuable role to play in the health service but he was not satisfied with the safeguards on access to information.

Moyle added that the levels of security were decided locally but he assured Bowden that safeguards were rigorously used.

One area where computerisation should be stepped up as a top priority is that of pay-as-you-earn income tax, according to Conservative MP Kenneth Baker (Marylebone).

He said computerisation of this system would save the country money in clerical staff and would help the Chancellor of the Exchequer and the public by speeding up the introduction of tax rate changes.

Baker said he was not satisfied with a written Commons reply from the Treasury Financial Secretary, Robert Sheldon (Lab, Ashton under Lyne) who told him that a small pilot scheme in six tax offices in the Midlands and the North West was being used to test the feasibility of introducing a national system by the mid-1980s. The pilot system comprises 70 Raytheon Cossor display terminals linked to a Honeywell series 700 minicomputer (CW, November 4, 1976).

"There's a strong need to computerise the system as soon as possible," Baker said. "Bob Sheldon would say that every bug must be ironed out first, but I say it's better to have a system that works for 95% of cases. If we aim at 100% perfection we'll never get a system."

PARLIAMENTARY REPORT

IBM terminals at Co-op

FOLLOWING its acceptance at Lloyds Bank, the IBM 3600 series of banking terminal equipment has now also found favour at the Co-operative Bank, where a pilot installation of items from the line is to be established at one of its 62 branches, probably in the Midlands.

The equipment to be acquired is worth £400,000, but the bank is not saying which items it is taking. The 3600 series consists of a range of back-office terminals, concentrators and other communications devices and automatic teller terminals.

All 62 branches of the bank are now online to the twin 370/135 installation in Manchester via IBM 3940 back-office terminals and Datapoint 1100 terminals running in IBM emulation mode.

Disk-o-tek first UK user

LATEST package in the range marketed by Business and Technical Systems (Bata) is a disc-space management aid, known as Disk-o-tek, for IBM 380/370 DOS installations.

Disk-o-tek allocates space economically for each file as it is opened, says Bats. It also removes the necessity for separate disc areas for programs in different partitions. Apart from saving disc-space, this simplifies the job control language.

The product also includes a suite of utilities enabling files to be deleted, revived or located, and generating reports from the VTOC disc directory.

Disk-o-tek was developed by National Computing Industries, of Georgia. The first UK user is Safeway Food Stores, with an IBM 370/135 in Aylesford, Kent. A spokesman said that the reduced disc space had meant avoiding the purchase of two extra 3348 disc cartridges.

Disk-o-tek is priced at £1,700, or £80 per month.

Wellorax moves to Kingston

A MOVE to Kingston-upon-Thames has been announced by Wellorax, the computer bureau, from its Westfield House, Hampton Court, address. The company is now at 12 Canbury Passage, Richmond Road, Kingston-upon-Thames, Surrey.

Eurologic Software, part of the Wellorax Group, has moved to the same address.

Harris Series 100 speaks your kind of language

Fortran IV · Cobol 74 · Basic · Harris Macro Assembler · RPG11
Forgo (Diagnostic) · Snobol 4

In fact, the Harris Series 100 range of five general-purpose, virtual memory computer systems can handle all these languages simultaneously. That makes them ideally suited for use in commercial, scientific and educational roles.

Each of these modular, complete systems is an expanded and more powerful version of the S110, the basic model in the series which features:

- ☐ 96K Bytes of Memory and a Scientific Arithmetic Unit
- ☐ System console CRT with keyboard and controller
- ☐ 10.8M Byte Cartridge Disc and 9 track, 800 BPI, 45 IPS Magnetic Tape Unit, with associated controllers
- ☐ DMA Communications Multiplexer
- ☐ Seven language processors, five support libraries—including Total, the renowned Data Base Management System and four RJE and two RBT packages.

A card reader and line printer are standard with all, except the basic system, the S110.

To ensure maximum efficiency in every system, the Harris Virtual Memory Manager (VULCAN) comes as part of the overall package.

VULCAN is a comprehensive demand-paging virtual memory operating system with a simple user-oriented job control language.

With VULCAN each system can operate, concurrently, in interactive time-sharing, multi-level batch processing and real-time processing modes. And with VULCAN, all seven processing languages and support libraries can be used simultaneously.

The System 120, part of the Harris series 100 range.

HARRIS COMPUTER SYSTEMS
Harris Systems Limited, Computer Systems Division
146 Farnham Road, Slough, Berkshire SL1 4XP
Telephone: Slough 34666 Telex: 848174 HARRIS G

What Doctor Who will see in office of the future

By Sam Fedida

THERE are probably as many conceptions of the automated office as there are people talking about it. It is possible to look well ahead to a futuristic science fiction horizon, with robots doing all the manual work, voice-operated and responding computers and the like.

No doubt all this will one day be possible, even practicable and eventually come to pass, but it is difficult to put a definite date on the event.

Without looking too far ahead there are sufficient developments in hand or anticipated for the not too distant future to form a reasonably accurate mental picture about the office of the 1980s, and possibly that of the 1990s.

Office work is essentially to do with communicating with other people and with the processing of information, to enable meaningful communication and decision-making to take place; thus advances in information and manipulation and in communications technology will have a profound impact on the office of the future.

Four current developments, all pursued with great vigour, and attracting considerable attention and even enthusiasm from potential users will in their maturity, hopefully in the next few years, provide a solid foundation for the automated office.

Three of them are to do with new or more efficient and effective artefacts. The fourth, Viewdata, which occupies a fundamental and possibly crucial place because of its importance, is a system rather than a component.

Its importance is in the difficult but tremendously exciting area of the interface — or perhaps a better word is relationship — between the man (the user) and his artefacts.

"Office work is essentially to do with communicating with other people and with the processing of information..."

It is in fact a relationship between the user and the man who designs the system and its software for the benefit of the user, anticipating (intelligently and correctly, it is to be hoped), his needs, his thinking and his responses.

First of the artefacts is the television display. This is currently and may perhaps remain for many years to come the simplest, cheapest and most versatile means available for a machine to communicate with a human.

There is a possibility that a different kind of display technique, that is, not using cathode ray tubes, might in the next decade be developed to the point where it might be considered an effective competitor. But the probability is not very great, although it would not be wise to discount it altogether.

Television displays using cathode ray tubes have such a formidable combination of favourable attributes that the likelihood of finding an equally good replacement is rather low. They provide easy readability in all lighting conditions including ambient illumination for viewers of all ages, alpha-numeric, graphic, pictorial and colour display capabilities, a very high level of reliability, a mature technology, substantial potential for further development and low cost.

The second artefact is the microprocessor. This device is clearly only at the threshold of its development. It brings to the user an enormous amount of information processing power, in a convenient and readily available form at such a low cost that its widespread use, even for trivial, but time-consuming and otherwise labour-intensive operations, may be accepted with equanimity (indeed even welcomed).

The third artefact is the optical fibre which, used in a communication role alone, can provide an adequate medium for the transmission of large volumes of information at high speed and at reasonable cost between distant locations, from where the information is available to where it is needed.

The fourth item in the development of the automated office is Viewdata. This term is used here to convey the generic class rather than just the specific system currently being marketed by the Post Office, which has the major attributes of what is needed in the automated office.

Viewdata is the instrument that pulls together these artefacts to make the complete and many-sided automated office, in the same way that the office manager co-ordinates all the activities of the office so that each function may be performed in unison with all the others. It is also the versatile and ubiquitous office factotum who, toiling in the background, ensures that everything runs smoothly and on time, that information needed is available in the right form at the right place and at the right time, who is there to advise when needed, prompt discreetly when action is required.

There are many activities running concurrently in the office. Mail has to be handled. When prepared it needs to be recorded, then despatched. Confirmation needs to be available in some cases that it has been duly received. Mail received must be recorded, then distributed. Its whereabouts must be noted so that it may be retrieved at short notice, when needed.

Office routines must be monitored — diaries maintained, notices of meetings must be despatched in time together with appropriate documents. The preparation, despatch and collection of the appropriate documents must be carried out meticulously.

Information needed must be located, retrieved and distributed. Budgets, accounts of expenditure, production, revenue, cash flow must be collected together, presented in suitable form, perhaps in many different ways, and presented when needed.

Information relating to or generated within or outside the office must be identified, located and made available. Perhaps some processing requires to be carried out on this information before it can be properly digested.

Communications channels must be established promptly and efficiently with others in the office or elsewhere.

Clearly all or most of these jobs may be carried out by one or more computers suitably programmed. With each program or computer a specialist (sometimes a programmer) must be available to drive it. Thus the more we automate, the more we become dependent on human assistance.

The key to this problem is to recognise that in this and other situations we need to take an overall systems approach, and regard the manager and his assistants in the office as laymen as far as using the computer in its multiplicity of forms and protocols is considered.

While perfectly competent to define his information requirements, and to use this information when it is made available, the manager cannot be burdened with innumerable computer protocols, each with its quasi-infinite minutiae of often irrelevant and unnecessarily complicated detail.

This is where Viewdata has created a place for itself in the areas of information retrieval and dissemination, and of communications and information processing. Viewdata recognises that the enormous variety of tasks which humans are required to perform must of necessity be handled by a versatile language which comes as close as possible to the versatility and generality of a natural language, but without its lack of precision and ambiguity.

The principles of Viewdata in the current Post Office system are now well established, and much has been written about its important facets.

A popular view of the office of the future is that it will resemble something out of Doctor Who . . . . Robots will do most of the manual jobs with voice-operated micros, etc assisting.

In the medium term, say the 1980s and 1990s, four current developments will provide solid foundations for the automated office.

Sam Fedida, head of the Post Office computer research applications division, looks at each of these artefacts and sees the Viewdata concept as the instrument for pulling the four together to make the complete and many-sided automated office.

He also predicts that Viewdata will be enhanced to handle business and domestic mail and pictorial information.

Further developments of Viewdata in the coming decade will be mainly centred on the enhancement of the system to enable it to handle business and domestic mail electronically, and to acquire the capability of handling pictorial information. The latter is mainly dependent on the establishment of wide-band data networks at the local, national and international levels possibly based on optical fibres.

A likely scenario for the automated office, based on Viewdata, might be this.

Mail handling. Mail is prepared off-line, using microprocessor-controlled terminals with TV screen display, and local editing and storage facilities on cassette recorders or floppy discs. After hours Viewdata calls the office terminals automatically, reads off the mail and despatches it to its destination, to the outside world or even within the organisation. Since mail is transmitted after hours on Viewdata, transmission costs are kept to a minimum.

Urgent mail may be transmitted as soon as it is ready using Viewdata message facilities, at a slightly increased cost.

Viewdata can handle messages to multiple addresses such as circulars, mail shots and so on, thus taking the total mail burden off the clerical staff. Viewdata can also connect up to the Telex network, providing access to a worldwide audience using a telecommunications system already well developed.

At the receiving end, incoming mail may be deposited in the local terminal store automatically, or held in the local Viewdata computer to await retrieval. Where necessary hard copy of all or selected pieces of mail may be obtained at will, although generally it will be more economical to file all correspondence in the organisation's own computer or in the local Viewdata computer centre from where it may be retrieved when needed.

Thus Viewdata can look after the total process of collecting, transmitting, distributing, receiving, storing and filing all mail. The local Viewdata centre provides low-cost mass storage for rarely accessed documentation and fast online random access storage, possibly on bubble memory or charge-coupled device memory, for frequently needed documents.

Note that with this arrangement files and documents are accessible not only from the office, but also from any location which has an entry point to the telecommunications network, be it wide-band optical fibre or the current speech-band telephone.

Mail preparation and processing will in many cases justify a dedicated office terminal providing off-line editing and other clerical facilities. In small offices, however, where the volume is low, online mail preparation and editing may well be more economic; the local Viewdata centre providing the necessary computer back-up. The trade-off is between communications costs and local processing costs.

Gathering management information. All management information, for example money transfers, sales, production levels, inventories and holiday rotas, could be made available instantly on a worldwide basis, using Viewdata and its international counterparts.

Data gathering of intermittent nature is probably best carried out using local intelligent terminals with some storage capabilities. As in the case of mail, the day's records are collected automatically with Viewdata and collated, analysed and stored in the appropriate file ready to be retrieved when needed.

Further processing on this data, for instance calculating moving averages, total equivalent cash value and comparison with earlier periods, may be able to carry on Viewdata and displayed graphically.

In this case also, all data may be retrieved and examined at any desired location, thus making it possible for the executive to have access to his management data wherever he is.

The simple Viewdata access rules and information retrieval and processing methods enable the manager to interrogate personally the files he needs and to instruct Viewdata to carry out any operation he requires.

Access to worldwide databanks. Already in Europe there are more than 340 bibliographic files or databases which contain references to documents from which the user may extract the information relevant to his needs, and 150 databanks which contain the direct information required.

"Viewdata is the instrument that . . . . makes the complete and many-sided automated office . . ."

Some databanks are supported by suites of computer programs which enable the user to carry out calculations on the data stored in the databanks.

Specialists in the use of databases and databanks are able to access these direct through various networks which have been or are being established specifically for this purpose, such as Arpanet and Euronet.

For the high level executive who may need to access these databanks relatively infrequently, the business of acquiring fluency in all these varied and complex protocols is daunting and in practice well nigh impossible. Viewdata comes to the rescue once again by providing a kind of translation service to enable the infrequent user of a databank to obtain the information he needs without difficulty. Thus a local call to the Viewdata centre will provide the executive with access to databanks worldwide and when he requires it.

A brief look at the titles of some of the established databanks in Europe will provide a feel for the tremendous scope of this facility. The databases and databanks cover bibliographical references on agriculture, including tropical agriculture, aquatic science and fisheries, dairy science abstracts, through to chemical abstracts, astronomy, pharmacy, civil engineering, electrical and electronic engineering, energy, business and economics, education and management.

Thus a whole universe of information is available to the executive from his office, home or indeed any local telephone with access to the worldwide telecommunications network and Viewdata.

Where companies can enjoy 10 tax-free years

DID you know that a bottle of whisky costs £9.71 in Iraq and only £2.04 in Qatar? Or that the annual salary of a trained factory worker in Sudan is £594? Or that companies can operate for 10 years without paying tax in Kuwait?

These facts are culled from two books* which should make extremely useful reading for companies considering exporting to the Middle East, Africa and Asia.

The first, Middle East Costs, lists prices of accommodation, transport, utilities, food, drinks, tobacco, clothes, consumer goods, education, medical care, entertainment, business accommodation, office services, salaries and social security for 10 Middle East countries.

The other book covers taxation in the Middle East, Ghana, Kenya, Nigeria, India, Singapore and Japan. Topics range from personal and company taxes to incentives, capital gains, depreciation and Excise duties.

* **Middle East Costs**, 52 pp. £10. **Taxation in the Middle East, Africa and Asia**, 136 pp. £12.50. Confederation of British Industry, CBI Print and Publications Department, 21 Tothill Street, London SW1H 9LP.

Japanese aim at US office market

THREE Japanese manufacturers are now preparing to enter the US office computer market. Nippon Electric has a Massachusetts subsidiary set to launch the 16-bit micro-based NEAC-100 system, Mitsubishi is almost ready to announce its Melcom line, and Toshiba is now planning to introduce its Tosbac line.

Mitsubishi marketed Melcom business systems in the UK for a short time, but pulled out because of poor response.

In Germany, 1977 is the year of the hospital automatic system for DEC. The company exhibited its KIGST-SYS medical system at the Systems 77 exhibition in Munich in October, and gave a repeat performance at the Medica 77 show in Düsseldorf a fortnight ago. KIGST-SYS was developed for Germany's Council for Data Processing, and includes a PDP-11 mini supporting up to 64 terminals. The picture shows a terminal in the clinical chemistry laboratory at the Caritas hospital in Bad Mergentheim.

Berlei leads the way in UK with a 2950

TO establish a teleprocessing network that will link its seven factories, Berlei, the bra and swimwear manufacturer, has ordered an ICL 2950. This the first UK order to be reported and the system is due to be installed next August at the company's headquarters at Slough, Middlesex.

ICL is coy about other orders in the UK but there are now seven overseas sales. In Australia the Swan Brewery, Perth, is to have a system and another order has been placed in New Zealand.

In Europe, two 2950s are to replace 1901Ts in West Germany, and a Danish publishing house in Copenhagen plans to replace its 2904 with a 2950 in 1979. Two other orders have been placed in South Africa.

The Berlei machine will be installed alongside an existing 1902T. Bob Haacke, the DP manager, told Computer Weekly, "We have order processing, sales ledger and file inquiry running online on the 1902T and these will continue."

At present there are two 7502 VDU cluster systems supporting 16 terminals at Slough and a 7181 display unit at the Merthyr Tydfil factory, all online to the 1902T.

"We want to put terminals which can talk to the 2950 in all our seven factories," says Haacke. "We are investigating whether to have any local intelligence at the factories or do the processing here at Slough. We will only use DME/3 on the 2950 as standby for the programs on the 1902T. On the 2950 we want a total teleprocessing environment, operating on IDMS files."

The 1902T, which is expected to be in operation for another three or four years, is on seven-year lease, but Berlei plans to buy it and lease the 2950. It is estimated that the cost will be about the same in monthly payments as the 1902T is costing now.

"The 2950 is good value for money, much better than the 1900," comments Haacke.

The system will have 768-bytes of main memory, four EDS 200 disc drives, four tape drives, card reader and the new CP1 train printer. Programming will be in Cobol. Berlei is looking for development staff at all levels to work on the project.

Report predicts boom in display terminals market

ANNUAL sales of interactive display terminals in Western Europe will jump from £95 million in 1976 to £330 million by 1986, to provide vendors with a grand total of £2,121 million worth of business over the ten-year period. This is one of the main predictions made in a study* of the West European terminal market, from the US consultancy, Frost and Sullivan.

In contrast to the boom in display terminal business, sales of interactive keyboard/printer terminals are predicted to fall after 1980, from a peak of £79 million to £48 million by 1986. Sales of general purpose batch terminals will go more or less the same way. The study sees them declining from £104 million in 1980 to £63 million in 1986.

Special purpose terminals are seen as having a much more healthy future, with annual sales increasing from £52 million in 1976 to £72 million in 1986, but the most rapid growth of all will be in sales of point of sale terminals.

Frost and Sullivan predicts that the non-food retail store sector of the PoS market will provide £80 million worth of business for vendors by 1986, compared with £18 million in 1976, while the value of PoS terminals sold to the supermarket sectors will leap from a mere £1 million in 1978 to £79 million by 1986.

Another area of rapid growth will be the graphic display terminals, where annual sales will increase from £8 million to £25 million over the 10-year period. Shipments of other special purpose terminals for applications like industrial data collection, credit authorisation and ticket issuing will rise from £12 million to £49 million.

* **Computer Terminals in Europe**, 384pp. £750. Frost and Sullivan Ltd, 104/112 Marylebone Lane, W1M 5FU. Tel: 01-486 1377/8.

New programs from National fill the usability gap

MICROCOMPUTER technology is forcing a much closer interface between the user and the manufacturer, according to Bill Baker, microprocessor group director for National Semiconductor, and the manufacturers must lead the way. National, therefore, has introduced two new, user oriented programs aimed at plugging the gap.

Speaking in London at the weekend, at the end of a European tour, Baker said that the National programs complemented efforts now being made in the US to produce a set of standards for microprocessors, efforts being spearheaded by the IEEE.

The first program that Baker's engineering team has produced has been called Microbus. This has established a set of definitions for the interface between a CPU chip and its supporting peripheral devices, in terms of such parameters as signal levels, timings and pin definitions. This, according to Baker, will remove a lot of uncertainty among users concerning which devices can be used together, and how.

The second program, Silicon Software, is aimed at removing many user problems in software implementation. Based on National's Maxirom technology, which allows the construction of single chip, 64K ROMs, memories are to be made available that contain the systems support software required by the user.

The first two devices are the 8295, containing the 4K National Industrial Basic Language (Nibl) interpreter, line assembler, punch routine and editor, intended for use with National's SC/MP processors, and the 8298, containing an 8K Basic interpreter with hexadecimal debugger front end, for use with the 8080 processor family.

Already available in sample quantities, at a price of under $100, these Microbus-compatible parts will be followed by further introductions soon.

Baker indicated that other high level languages, such as Fortran and Cobol, were probable.

SPECIAL LOW PRICE ARRANGEMENTS FOR VISITING OVERSEAS TRADE FAIRS

IPC Electrical-Electronic Press Ltd., the world's largest publishers of computer, electrical and electronic journals, have made special arrangements for readers wishing to visit important overseas trade fairs. The cost, in most cases, is little more than the normal air fare but includes - travel by scheduled airline from Heathrow and Manchester * first-class hotel accommodation * arrival and departure transfers * admission to the trade fair * services of an experienced tour manager. The current programme comprises the following tours.

To obtain a brochure and booking form, tick the box against the tours in which you are interested, complete the coupon and post to the exclusively appointed travel agent, Commercial Trade Travel Ltd., Carlisle House, 8 Southampton Row, London WC1. Telephone: 01-405 8666 or 01-405 5469.

INTERNATIONAL ELECTRONIC COMPONENTS ☐	Paris	April 3-8
HANOVER FAIR ☐	Hanover	April 19-27
COMPEC EUROPE ☐	Brussels	May 9-12
SICOB ☐	Paris	September 20-22
ELECTRIC VEHICLE EXPO ☐	Philadelphia	October 3-6
NUCLEX ☐	Basel	October 3-7
ELECTRONICA ☐	Munich	November 9-15

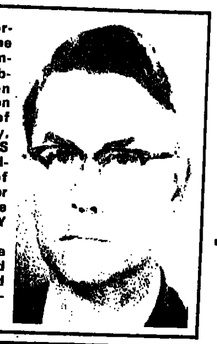
Please send details of the tours indicated above

NAME COMPANY

ADDRESS Telephone

A recent report "Information Processing in the United States: A Quantitative Summary", published by the American Federation of Information Processing Societies, of Montvale, New Jersey, predicts the decline of US dominance of the worldwide installed base of general purpose computer systems over the next five years, writes BECKY BARNA.

An even greater decline in US superiority predicted is in the mini and dedicated application computer systems markets.



Predicting the decline of US dominance

OVER the next five years the US can expect a diminution in its dominance of the worldwide installed base of general purpose computer systems, and an even greater decline in its superiority in the mini and dedicated application computer systems markets. Contributing to this gradual erosion of the US stranglehold will be the aggressive Japanese computer manufacturers.

These predictions are the latest in a series developed by Frederic G. Withington, head of data processing industry forecasting at Arthur D. Little, Inc, a leading market research company of Cambridge, Massachusetts. Withington's observations were added to that of other noted US computer experts to produce a report published recently by the American Federation of Information Processing Societies, of Montvale, New Jersey.

"Information Processing in the United States: A Quantitative Summary" is in essence an update of an earlier AFIPS study containing data for 1971 and forecasts for 1976. Because the predictions in the previous study proved "reasonably accurate", according to AFIPS, the organisation is optimistic that the more recent prognostications will bear out.

In addition to ADL, two other market research firms contributed to the study: International Data Corp, of Newton, Massachusetts and Auerbach Associates, Inc, of Philadelphia, Pennsylvania. Data was also supplied by the US Department of Commerce's Domestic and International Business Administration, Commerce's National Bureau of Standards, and the US Department of Labor's Bureau of Labor Statistics.

According to Withington, general purpose computers of US manufacture accounted for 87% by value of the world's installed base in 1976 (see Figure 1). US dominance in this market is expected to decline, however, to 81% by 1981. He predicted that the US share of the overseas installed base will drop off even more sharply, from 75% in 1976 to 67% in 1981. Because installed base is a cumulative figure, heavily weighted by past sales, the reduction in American strength is expected to cause concern to US vendors.

Market dominance is particularly important to US mainframe manufacturers, which reportedly net 50% of their total revenues from overseas sales. US exports of computing equipment exceed imports by a ratio of 15 to 1, and this year will result in a net trade surplus of $2.8 thousand million. Computer technology is vital to the US as a means of offsetting costly energy imports.

Japan poses a strong competitive threat to the US industry, reasons Withington, primarily because of that nation's "integrated, export-oriented economy". Japanese companies offer complete lines of general purpose systems and devote substantial sums to research and development.

"The onslaught of Japan, Inc," says Withington, "will pose a great battle for US companies." The soothsayer is quick to add that the US will "continue to dominate the world computer market" for many moons.

Using 1974 as a base year, the Commerce Department compared the US with selected countries by calculating the portion of the gross national product represented by the installed computer base. The federal department's data indicates the US had an installed base of 168,800 systems, representing 2.3% of the US GNP, in 1974 (see Figure 2).

For the same year, corresponding figures showed Japan had 30,095 systems, equivalent to 1.2% of its GNP, the UK had 15,520 computers, or 2% of its GNP, and West Germany had 20,860 machines or 1.2% of its GNP.

Most of the AFIPS report is concerned with three topics: US suppliers of computing equipment and services, US institutional users of computers and services and personnel constituting the US computer workforce.

AFIPS points out that the amount spent by US users per capita doubled in the period from 1970 through 1975, an expenditure trend that is expected to continue during the five-year spans through 1985. Similarly, revenues of computer manufacturers and services vendors doubled in the five-year period ending in 1976 and are expected to double again by 1981.

The value of shipments of minicomputers and dedicated application systems will outpace overall shipments. According to AFIPS data, this market increased by a factor of four from 1971 through 1976, and should do so again by 1981.

While the cost/performance ratio of hardware has improved by a factor of 100 each decade since 1955, and should continue to do so for at least the next decade, the problems of software improvement have not been solved. Programmer productivity appears to be improving at only 3% per year.

The problem may be resolved, the report contends, if new technology in the software area can lessen the need for programmer training and substitute training of users in the control of intelligent terminals. The software problem, according to the AFIPS report, "is the critical path in dealing with data processing in the next decade."

	GNP ($ Billions)	Installed Base Value ($ Billions)	Installed Base as % of GNP	Population (Millions of People)	Installed Base Number (Systems)	Number of Systems per Million Population
United States	1,413.2[I]	33.6	2.3	211.9	168,800	797
Japan	450.0	5.4	1.2	109.7	30,095	274
West Germany	367.6	4.4	1.2	62.0	20,860	337
United Kingdom	173.1	3.5	2.0	56.2	15,520	276
France	282.7	3.5	1.2	52.5	13,064	249
USSR and 6 Eastern European Countries	710.0	4.5	0.6	252.1	12,590	50
	956.2	5.6[II]	0.6	366.9	15,436	42

I GNP from *Statistical Abstract of the United States, 1976*, Bureau of the Census, U.S. Department of Commerce.
II The value of computer bases in the Eastern European countries is assumed to be related to that of the Soviet Union in the same proportion as the number of computers installed are related.
Source: Based on data in *The American Computer Industry in its International Environment*, Domestic and International Business Administration, U.S. Department of Commerce, November, 1976.

Figure 2: Domestic installed base in relation to gross national product (GNP) and population: selected countries, 1974.

Location of Installed Base	% of Installed Base Value Provided by U.S. firms	
	1976 Estimate	1981 Forecast
United States	100	97
Canada	95	92
Western Europe	88	81
Eastern Europe	5	10
Japan	44	40
Others	85	80
Overseas	75	67
World	87	81

Figure 3: Installed base from *US Computer Firms (% total value in current countries, Overseas World*, 1976, 1981 (excluding [illegible] and [illegible] applications systems).

HAVE YOU CONSIDERED THIS ISSUE?

The ubiquitous terminal provides the theme for this, the Compec issue of DATA PROCESSING. We explore its constantly changing face; the latest models; likely future developments; together with some pointers for choosing the right equipment.

Data preparation — the often neglected areas where so many data processing problems have their origins. We investigate the latest developments.

Man, machine and the interface: we carry a special report on bringing the computer to the people that matter — the end users.

These are just three of the vital features to be found in the November issue of DATA PROCESSING.

Add to this: pages of products, concentrating this month on terminals and data preparation; the microprocessing scene; exhibition reports; information for first time users; a round-up of the latest news in convenient form — and you begin to understand why DATA PROCESSING is essential reading for dp managers, chief accountants and management services directors.

All this, and much more, is packed into the November issue alone.

Can you afford not to subscribe to DATA PROCESSING? — it costs just £15 a year (overseas £18) for 10 issues, all just as full of articles and information essential to anyone involved in dp management.

To subscribe, simply complete and return the order form to:
ROOM 218, DORSET HOUSE, STAMFORD STREET, LONDON SE1 9LU.

Data Processing Subscription Order Form

Please enter my subscription to Data Processing starting with the current issue. I enclose remittance value £15.00.

CHEQUES/P.O.s SHOULD BE MADE PAYABLE TO IPC BUSINESS PRESS LTD.

Name .....

Address .....

DP/3/77

Books and Brochures

Organising databases

Data Base Organisation for Data Management by Sakti P. Ghosh. 376pp £20.95. Academic Press.

THE author's motivation for producing this book originates from his claim that there are no texts currently available on database organisation which are usable at the graduate level. While this claim may have been true when he commenced writing this book it is certainly not valid now, since there are currently several good texts available. Despite this, Ghosh's book is both interesting and different from the others that are in circulation. I am sure it will be found by many to be of substantial utility and will constitute an extremely useful addition to the library shelf.

The early part of the book is devoted to a discussion of data description models; the structure, representation and analysis of queries; searching and sorting; key to address transformation algorithms; and filing schemes for answering queries that are based upon the specification of many attributes each of which have multiple values. The latter part of the text goes on to describe the types of access paths used for the retrieval of data and then proceeds to a discussion of various techniques for organising records on drum storage.

In order to give the reader a hand with some of the quite complex mathematical concepts, Chapter 1 ("Data Structures") contains a section on mathematical topics. Although this section is helpful, it is not of sufficient depth to enable the reader to manage without other support material.

Every chapter of the book concludes with a selection of exercises and problems based upon the material covered in that chapter. Some of these are very difficult. In view of this it would have been helpful if the author had provided answers — particularly if he had intended the book to be used for teaching purposes.

In Chaper 3 ("Searching on One Field") the author states: "Human beings are searching for things all the time, but very few care to examine the basic concepts underlying searching". In my experience one of the most important aids to searching is the availability of indexes that are both accurate and as comprehensive as is possible for the subject matter that they claim to cover. Unfortunately, this cannot be said of the indexes that are contained within this book.

They are scanty, incomplete and contain several errors. For example, in the subject index there are no entries for "J", even though the body of the text makes many references to the database "join" operation. Similarly, the "I" section contains no entry for IBM, IMS or information, all of which are cited and/or defined within the text. The author index is similarly lacking in both accuracy and content. Thus, Buchholz is wrongly spelled, and the incorrect spelling is consistently used throughout the book.

There are many other spelling and typographical errors, in addition to many slight grammatical errors, the most popular of which is the omission of the indefinite article in many of the definitions that are given. For example, 'A part of a graph is called partial graph' and ' . . . logically related information which is treated as a contiguous set is referred to as segment'. There are multiple instances of this. However, these criticisms are just of the English style used. Although they reduce readability they do not seriously detract from the good computer science contained between the covers.

This is a good book and makes an important contribution to its field. It is expensive, but it contains much valuable information and many refreshing ideas. I would not recommend it to those whose mathematics is weak, or who have a fear of abstract notation. The only major negative criticisms of the book that I have are based upon the weakness of the indexes and the lack of answers to the problems that are set.

P. G. BARKER

Dangerous datanet

The Shockwave Rider by John Brunner. 288pp. 85p. Orbit paperback, Futura Publications.

RIGHT now we are laying the foundations of a world in which computing and communications have converged. But shall we be able to cope with it? Shall we want to live in it?

Being an experienced writer of SF (S for social — remember "Stand on Zanzibar" and "The Squares of the City"?), John Brunner is better able than most to draw a convincing picture of a world in which most of us could be living in 25 years' time. "The Shockwave Rider" explores the social impact of a public datanet within an environment suggested by Toffler's "Future Shock". Keeping a tight rein on the technology, Brunner exposes some of the crucial questions on privacy, freedom of access to information and its deliberate misuse by the power elite. Through their impacts on the lives of his characters these questions assume more than academic interest.

In the author's US of the early 21st century (when many of us will be middle-aged) terminals, computers and database networks form the framework of the social structure. Anyone with a high enough pass-code and sufficient skill can "mouse around" in the datanet to his mind's content, usually through a home terminal. A particularly fascinating concept is the "tapeworm", an autonomous packet of information that, once entered, can move around the network defending and even reproducing itself while changing the data already held in the network.

For most of the future-shocked population, the datanet is a source of anxiety. They know, for example, that an individual's credit can be frozen for months by a malicious input and that this is only one of many ways in which personal security is threatened. Indeed, recognition of a person's existence depends more upon representative information than on the individual's physical reality.

The shockwave rider of the title is a young man who has absconded from a government research institution. To avoid capture he uses his computing virtuosity periodically to rewrite his identity on the datanet. Thereafter he lives each role in detail — utopia designer, lifestyle consultant, priest and "systems rationaliser" (we could use the last right now!). At first, he thrives on change, but after "overloading" (nervous breakdown) he works to render the datanet harmless, with some very interesting consequences.

The story line is rich. Brunner's wry, humour comes over in headings like "The Basic Straining Manual". His attention to detail even runs to a convincing 21st century slang (inspired, perhaps, by Burgess's "Clockwork Orange") and helps to absorb the reader into the world he portrays. Needless to say, overload is a commonplace.

I found the book highly readable and plausible enough to be quite worrying. The book's main message is clear, and we in the computer industry should take it seriously and respond to it. Criticisms? Only that the blurb on the back cover is misleading.

PAUL ELLIS

A COMPREHENSIVE brochure on a range of silencers for virtually every IBM business machine has been produced by the Power Equipment Company. It describes in detail 13 different silencers, which are said to be able to reduce noise levels by at least 70% on 26 commonly used IBM models. Copies are available from the Power Equipment Company, Kingsbury Works, Kingsbury Road, LMONDON, NW9 8UU.

A NEW British Standard, BS 5619, "Ribbons and spools used on office machines and data processing equipment" has been published. It has four parts: (1) Minimum markings to appear on containers of printing machines; (2) widths of fabric printing ribbons on spools up to 18mm wide; (3) widths of one-time paper or plastics printing ribbons up to 18mm wide and marking to indicate the end of the ribbons; and (4) characteristics of cores for paper or plastics printing ribbons. BS 5619 Parts 1 to 4, price £1.40 each parts, may be obtained from BSI Sales Dept. 101, Pentonville Road, London N1 9ND.

Analysis of neuronal structure

Computer Analysis of Neuronal Structures, edited by Robert D. Lindsay. 210pp. $27. Computers in Biology and Medicine Series, Plenum Press, New York.

THIS book shows how progress is being made in providing a quantitative description of neuronal structures and how computer systems have been devised to assist in the work. The differing approaches by the authors are essentially application orientated, explaining the principles of the computer approaches adopted, rather than describing the computer hardware and software in detail. The book underlines the amount of numerical information required to represent the structure of a single neurone and the effort required both to represent three-dimensional neuronal-type structures and to gather meaningful statistical information about them from experimental measurements.

Computer graphics is very much a growth area of computing activity at present, and this book makes clear how such techniques may be applied to the problems encountered in the examination and representation of neuronal structures.

This work is underpinned by some very sophisticated mathematical analysis but this does not prevent the non-mathematician from reading the text easily.

The level of presentation provides a good description of progress in this field, and there are sufficient references in each chapter for the work described to be pursued in more detail. The book clearly reveals the power of computing technology when it has been harnessed satisfactorily to the problems of handling complex research situations.

B. BARBER

Practical time sharing

Computer Time Sharing, by E. C. Aylward and B. Chakraborty. 74 pp. £1.60. The Institute of Practitioners in Work Study, Organisation and Methods, 9/10 River Front, Enfield, Middlesex EN1 3TE.

THIS PRACTICAL book on programming in Basic on a time sharing service using a printer terminal has been produced for non-computer people.

It starts by showing how to use a terminal, linked to a time sharing service, as little more than a calculator, and moves through to arrays, matrices and print formatting.

Later chapters deal with using statistical simulation, network analysis and management information packages.

PL/C basics: scratching the surface

PL/C Essentials, by Lawrence J. Mazlack. 145pp. Soft cover £5.20. McGraw-Hill.

THIS book is intended for newcomers, not only to PL/C, but to programming. The concepts that are covered are very elementary and in many cases they are not pursued to any great depth, presumably to avoid perplexing the student and also because the material contained in the book is intended to be supplemented by a suitable lecture course.

The text is organised into 14 chapters and nine appendices. Chapter Two on flowcharts consists of just two pages which present the terminology and an example. Subsequent chapters deal with program structure, language components, list-directed I/O, expressions, GOTOs and labels, decision statements, character string manipulation using SUBSTR, LENGTH and INDEX, subscripted variables, DO groups and loops, structures, disc I/O and simple subroutine procedures. Each chapter is augmented by a series of test questions to which answers are provided; there is also a variety of suggestions and specifications for programs which the student is invited to write. No answers for these are provided.

Areas that are not covered by the text include the concept of defaults, bit string variables, label variables, user defined function procedures, begin blocks and storage types. Edit-directed I/O is relegated to an appendix. The GOTO is used extensively and the author does not attempt to present any words of caution regarding the pitfalls associated with its undisciplined use.

In the collection of appendices, there is one devoted to layout conventions and rules for indentation of source code. Unfortunately, the student who follows the suggestions found here or who mimics the style used in the many illustrative computer programs embodied within the text could well end up by detracting from, rather than enhancing, the readability of his programs.

Appendix G (14 pages) consists of a listing of all the PL/C error codes and messages; their inclusion is unnecessary since this information is provided routinely by the PL/C compiler. Likewise, there is an appendix devoted to the use of the card punch which could have been omitted. As most programmers, particularly beginners, spend a great deal of their time debugging their programs, it was disappointing to find that Appendix B ("Debugging") consisted of only three pages that described desk-checking and the PL/C CHECK prefix. Nothing was mentioned about the use of PUT DATA, FLOW, etc or the use of the many aids provided by the compiler such as the dynamic flow trace, dump of active blocks and scalar automatics at program termination, etc.

The book contains some useful ideas and is quite well produced. It is free of typographical errors and contains lots of nicely reproduced listings of program source code designed to illustrate the various concepts presented. Unfortunately, its approach is of the "pre-structured programming" era. While it would make a useful text for those studying computing as an ancillary subject, specialists would not find it of interest, since it does not go into the topics it covers in sufficient depth. Indeed, it is a pity that this book only scratches the surface of PL/C, as there are many fascinating and interesting facets of the system which are left uncovered.

PHILIP BARKER

Algorithmic languages

Methods of algorithmic language implementation: No 47 in the Lecture Notes in Computer Science series, edited by A. Ershov, and C. H. A. Koster. 351pp. Softcover DM31, US $3.70. Springer-Verlag.

THE papers included here are all from the Symposium on Methods for the Implementation of Algorithmic Languages held at Novosibirsk in the USSR in September 1975. Their standard is very mixed: some deeply theoretical, some practically instructive, some giving only background information and status reports of projects; a few of them are highly readable (for example, Lecarme's paper describing a portable Pascal compiler), though rather more are totally opaque (for example, I. V. Vel'Bitskiy's paper on the formal definition of programming language semantics). This opacity arises in part from the double load of translation some of the papers have had to bear — firstly into Russian, and thence into English.

The subject matter ranges across the abstract properties of grammars, the representation of semantics at various levels within a compiler or compiler-writing system, data-structures, macros, and pragmatic points of compiler design. According to Koster's preface, they give a reasonably balanced impression of the state of the art in compiler-writing in Eastern European countries, and it would seem that the software techniques there employed are very bit as advanced as in Western Europe.

The papers most to be recommended may well commend themselves as being the most readable: Lecarme's (mentioned above); "On the macro extension of programming languages." by V. Sh. Kaufman, which contains a neat formalisation of what is already known about macros; and "Pragmatics in a compiler production system" by Jan Borowiec.

This is not a book to be read cover to cover, any more than one would read, say, the Journal of the ACM cover to cover. It is, however, a book to be recommended to university departments, and compiler-construction experts in Industry. It is to be hoped that everything which is original here will eventually be presented at some time in the future more clearly and more accessibly.

IAN D. K. KELLY

Portability

Software portability, an advanced course, ed. P. J. Brown 342pp. £7. Cambridge University Press.

LITTLE more need be said on the subject of software portability. The names of the main contributors — Brown, Griffiths, Griswold, Lawson, Niblett, Richards, Waite, Wilkinson — guarantee the qualities of this book, which is based on an advanced course given at the University of Kent early last year. It would be suitable for a postgraduate course or for undergraduates' project work. It is a little heavy for tired businessmen.

The areas covered are theory, methods, practical problems and legal aspects. These are followed by a series of case studies. The book closes with a look at future developments and a discussion of EEC and CNRS/SRC work.

Some of the material is widely available elsewhere; for example, that on Snobol 4 and the Nag library. Some of the chapters are rather thin and do not seem to relate very closely to the subject in hand. But some are particularly useful: those by Wickman, Niblett (the second one) and Frank for example.

My main reservations about this book are part of the reservations I have about computer science in general. The characteristics of computer languages, in particular their incompatibility, arise largely from historical accident and commercial policies (or lack of). To bring to bear on such a subject so high a level of intellectual endeavour strikes me as being possibly exaggerated.

BEVERLEY ROWE

MIDLANDS APPOINTMENTS

Midlands always in need of skilled staff

By Cathy Tracey

The Midlands offers the unusual combination of the attractions of city living, with easy access to more rural surroundings. With the cost of living significantly lower than in the South of England, it has always been a breeding ground for skilled people — and the DP field is no exception, says CATHY TRACEY, Midlands regional manager of Specialist Computer Recruitment Ltd at Birmingham.

THE demand for skilled data processing professionals in the Midlands area is still running at a substantial level. The emphasis, as ever, lies in a requirement for more junior programmers and analyst/programmers with up to three years' high-level commercial language experience, for technicians with solid experience in the more advanced areas — for example, database languages, and people who have worked on teleprocessing monitors, etc — and for mature analysts with good investigation, design and implementation experience with an emphasis on manufacturing-based systems.

The salary situation remains somewhat confused. Much of central Midlands industry consists of subsidiaries of large conglomerates often engaged in industries associated with, for example, the motor industry, or light/medium engineering. As major and responsible employers, these companies have, for the most part, strictly followed the government's pay guidelines.

Though offering a challenging and dynamic environment, job satisfaction and, from a career standpoint, a sound and relevant future to computer professionals, many have found themselves considerably behind market rates for computer appointments when compared with those organisations that have followed guidelines less closely, and when compared specifically with local government, freelance openings and those organisations which have been able to respond more effectively, in monetary terms, to the overall increase in salary scales within the computer disciplines.

In addition to the vast array of interesting projects and large scale investment which continues to be made in both systems development and hardware, the Midlands offers the unusual combination of the attractions of city living, with easy access to more rural surroundings.

Compared, particularly, with the South of England, the cost of housing, be it rented or bought, the cost of transportation, and the overall cost of living are significantly lower. The general economic situation is improving, and manufacturing industry alone has created 6,000 more jobs in the last few months, many in the DP field.

There is considerable activity on the hardware sales front, though few organisations maintain any sizeable centralised, or headquartered operations in the Midlands. Professional sales and marketing people, as always, are difficult to find if they are working at a territory sales or territory sales management level, and a considerable number of opportunities are open to them at this time.

In summary, the Midlands offers the combination of an attractive living environment, coupled with substantial opportunity in progressive computer sites against a background of realistic salary scales. In spite of emotive articles in a number of computer journals in recent weeks, for the mature and substantial employer, salary scales remain, largely, regularised and controlled, and continue to follow the pattern of other professions, rather than to have exerted on the salary market as a whole their own unique influence.

The Midlands has always been a breeding ground for good, skilled people. The DP field is no exception, and I believe will continue to be so in the future.

Co-Ordinator, Distributor Systems

Up to £6,295+Car Benefit

We are seeking an individual to act as the co-ordinator between the Systems Functions within the Parts, Sales and Marketing and Customer Service Divisions of Leyland Cars and its Distributor Network. He/she will be responsible for producing and maintaining comprehensive plans for the development of computer systems packages for the Distributor/Dealer Network including the marketing plans for these packages and ensuring appropriate level of intergration with Leyland Cars internal systems. The position will involve close liaison with the different Systems and Distributor Network functions involved in specifying, developing and selling Distributor systems.

Attractive starting salaries are offered, plus the fringe benefits package of a major organisation—including privilege Leyland Cars and accessories purchase plan, and relocation assistance if necessary.

If you are educated to degree or equivalent level; have 5 years proven record of success in a Systems role and an in-depth understanding of the operations of a Distributorship and its interfaces; and have the qualities to evolve, co-ordinate and integrate multi-Divisional plans, write giving sufficient details to make an application form unnecessary to:

Leyland Cars

Mr. G. T. Spiller
Co-Ordinator, Organisation & Management Planning,
Systems Staffs, Group and Manufacturing Staffs, Leyland Cars, Solihull Car Plant, P. O. Box 2, Meteor Works,
Lode Lane, Solihull, West Midlands. B92 8NW

LEICESTERSHIRE

DEVELOPMENT STAFF **SYSTEMS ANALYSTS & PROGRAMMERS**

SALARIES TO £5,500 P.A.

Varied and extensive development plans make it necessary for our clients to increase their current substantial computing facilities by the recruitment of both Systems Analysts and Programmers.

Development plans include continued usage of distributive processing, and will utilise advanced data base technology and mini computers. Successful applicants will be introduced to a broad spectrum of business problems, related to distributing, retailing and engineering companies.

We have been asked by our clients to identify all levels of expertise, with the basic requirement being six months' experience.

SYSTEMS ANALYSTS

* the ability to liaise with users
* ideally a programming background preferably in COBOL.

PROGRAMMERS

* the ability to progress into a supervisory role
* a fluency in either COBOL and/or ASSEMBLER

All applicants should have gained commercial understanding, preferably in an IBM environment. Career progression is excellent, so too are the working conditions, attractive fringe benefits include concessionary discounts on company products and generous relocation expenses.

For further details contact:

ANDY CARTER 021-236 3781 REF. NO. CW/12/1

SCR

SPECIALIST COMPUTER RECRUITMENT LTD.
BIRMINGHAM 021-236 3781 FREEPOST
Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR
MANCHESTER 061-833 0676 FREEPOST
Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD
LONDON 01-935 0671 FREEPOST 6
Freepost 6, 102, Blandford Street, London W1E 1JZ

Computing Services Association

MIDLANDS APPOINTMENTS

MARTINS COMPUTER SERVICES

Where the prospects are brighter

SYSTEMS

SYSTEMS ANALYST — 2 years plus experience in Systems, for ICL 1900 installation situated in South Birmingham. Salary to £6,700. Ref SA 107
TECHNICAL SUPPORT ANALYST — at least 5 years experience in Business Systems knowledge of Cics, or IMS required Salary c£6,000. Area Birmingham Ref SA 106
ANALYST/PROGRAMMER — for Honeywell magstream, at least 3 years experience with Cobol programming background Area Birmingham Salary to £6,000. Ref SA 104
SYSTEMS ANALYST — at least 7 years experience in DP, including 2 years Systems Analysis Area Loughborough Salary, NEG Ref. SA 103
SENIOR SYSTEMS ANALYST — responsible to Group DP Manager, at least two years production planning and Control Systems, plus a formal programming background in Cobol or RPG, experience of a small mainframes and Terminals required Area Worcestershire Salary to £8,000 Ref SA 098
SYSTEMS ANALYST — at least 2 years plus experience in Commercial Systems Area Rugby Salary NEG Ref SA 098
SYSTEMS ANALYST — 2 years plus experience in Commercial Systems Area Staffs. Salary c£4,500. Ref. SA 093
SYSTEMS SUPPORT ANALYST — with Programming background, to assist Pre and Post Sales work Area Birmingham. Salary to £7,000, plus Company car. Ref. SA089
ANALYST/PROGRAMMER — 3 years plus Cobol. Salary to £4,000 Area Nottingham Ref SA 088
SOFTWARE PROGRAMMER — 3 years plus Assembler in an Electronics Environment Area Nottingham Salary to £6,000 Ref. SA 088
SENIOR SYSTEMS ANALYST — Must be experienced in Production Control applications Area Leicester Salary c£5,500 Ref SA 086.
ANALYST/PROGRAMMER — 2 years plus experience in RPG II Area Leicester Salary to £6,000 Ref SA 085
ANALYST PROGRAMMER — 2 years plus IBM Cobol Area Leicester. Salary to £4,000 Ref. SA 034
SYSTEMS ANALYST — 3 years plus experience Manufacturing Systems Area Derby Salary to £5,000 Ref SA 081.
SYSTEMS ANALYST — at least 4 years in Commercial Applications Area Northampton Salary c£5,000 Ref SA 072
SYSTEMS ANALYST — 2 years plus Commercial Systems Area Halesowen Salary to £4,500. Ref. SA 071
SYSTEMS ANALYST — 3 years plus commercial Systems Area Loughborough Salary c£4,500 Ref SA 063
SYSTEMS ANALYST — 2 years plus commercial Systems. Area Wolverhampton Salary to £4,500 Ref SA 027
SENIOR SYSTEMS ANALYST — at least 4 years in Commercial Systems including Accounting. On-Line applications Area Coventry Salary to £8,500 Ref SA 024.

PROGRAMMERS

PROGRAMMER — 2 years plus Cobol. ICL preferred Area Staffs Salary c£4,000 Ref P 200
PROGRAMMERS — 1 year plus Experience Cobol or DMS 2 Area Coventry Salary £3,500-£4,500 Ref P 027
PROGRAMMER/ANALYST — 1 year Plus Cobol Total responsibility for small ICL 1903 installation Area Leicester Salary c£3 600 Ref P 206
PROGRAMMER — 1 year plus PL/1 or Assembler, knowledge of MVS, VS 2, Cics, or IMS an advantage Salary to £4,500 Area Birmingham Ref. P 205
PROGRAMMER — 18 months plus experience in ANS Cobol with knowledge of RPG II or Assembler and fully conversant with DOS. JCL Area Northampton Salary £5,400 Ref P 204
PROGRAMMER — 2 years plus experience Cobol. ICL preferred Area Loughborough Salary c£4,000 Ref P 203
SYSTEMS PROGRAMMER — 2 years plus Cobol on Operations environment Area Leicester Salary NEG Ref P 201
PROGRAMMER — 1 year plus COBOL Area Leicester. Salary NEG plus low interest mortgage Ref P 200
PROGRAMMER — 1 year plus NCR Neat 2 Area Leicester Salary NEG Ref P 199
PROGRAMMER — 2 years plus Assembler, with Cics or Teleprocessing Salary to £4,200 Area Birmingham Ref P 198
PROGRAMMER — 18 months plus Cobol, must be able to work on own initiative Area Hinckley Salary, c£3,500. Ref. P 194
PROGRAMMER — 2 years plus Cobol, any hardware Area West Birmingham Salary c£4,000 Ref P 192.
PROGRAMMERS — at least 1 year plus PL/1 or Assembler Area Grantham Salary NEG. Ref P 188
SYSTEMS PROGRAMMER — for development work. Must have experience on Dasplint or similar Main Area Birmingham Salary NEG Ref. P 187
PROGRAMMER — 1 year plus Cobol Area Northampton Salary c£3,200 plus subsidised mortgage facility. Ref P 186
PROGRAMMER — 1 year plus experience PL/1 or Cobol Opportunity to be involved in Systems Design, Area Wolverhampton Salary c£4,000. Ref P 185
SUPPORT PROGRAMMER — required by Mini Computer Manufacturer 1 year plus low level language Salary to £4,000 plus expenses Area Birmingham. Ref P 180
PROGRAMMER — 18 months plus Cobol Area Derby. Salary c£4,000. Ref. P 176
PROGRAMMER — 18 months plus IBM Cobol Area Leicester Salary c£4,000 Ref P 176
PROGRAMMER — 8 months Cobol Area Birmingham Salary c£4,000 Ref P 172
PROGRAMMER — 1 year plus Cobol any hardware. Area Coventry Salary c£4,000 Ref P 170
PROGRAMMER — 2 years plus experience in Cobol or Assembler Area Lincoln Salary c£4,000 Ref. P 163.
SENIOR PROGRAMMER — 2 years plus Cobol Area Rugby. Salary to £4,500 Ref. P 160
SENIOR PROGRAMMER/ANALYST — 2 years plus Cobol Area Birmingham Salary, to £4,500 Ref. P 153.
PROGRAMMER — 18 months plus Cobol Any hardware Area Coventry Salary to £4,000 Ref. P 126
PROGRAMMER — 2 years plus Cobol Area Stafford Salary c£4,000 Ref P 125
PROGRAMMER/ANALYST — with Basic plus experience Area Leicester Salary c£4,000 Ref P 119.
PROGRAMMER — 2 years plus Cobol or Assembler Area Leicester Salary to £4,000 Ref P 117
SYSTEMS PROGRAMMER — 2 years plus Programming in a Technical Environment Area Stoke on Trent Salary £3,500-£8,000 Ref P 116
SENIOR PROGRAMMER — 3 years plus Plan or Cobol Area Staffs Salary c£4,500 Ref P 114.
PROGRAMMER — 2 years plus ICL Cobol Area Stoke on Trent Salary c£4,000 Ref P 101
PROGRAMMERS — 1 year plus Cobol PL/1 or Assembler Area South Birmingham Salary £3,500-£4,500 Ref P 098
PROGRAMMER — 1 year plus RPG II, for Customer Support work Area Birmingham Salary to £6,000 plus expenses Ref P 094
PROGRAMMERS OR PROGRAMMERS/ANALYSTS — 2 years plus experience Any language for Mini or Business Consultants Area Birmingham Salary £3,500-£6,000 Ref P 087
PROGRAMMER — 1 year plus ICL Cobol Area West Bromwich Salary to £4,000 Ref P 060
PROGRAMMER/ANALYST — 2 years plus experience in RPG II or Assembler Area Cotswolds Salary to £4,500 Ref P 050
SENIOR PROGRAMMER — at least 3 years experience, in Basic Assembler or Cobol Area Tamworth Salary to £3,000 Ref P 026

OPERATIONS

COMPUTER OPERATOR — 1 year plus IBM DOS Area Staffs Salary c£3,000 Ref OP 071
ICL 1900 OPERATOR — George II, envolves weekend working Salary to £4,000 Area Coventry Ref OP 70
COMPUTER OPERATOR — ICL 1900 or 2903 1 year plus experience Area Leicester. Salary c£3,000 Ref OP 067.
COMPUTER OPERATOR — 18 months plus George II or Udas. Area. Loughborough Salary c£3,000 Ref OP 065
COMPUTER OPERATOR — 6 months plus experience George II or III. Age 18-23 Area South Birmingham Salary c£2,750. Ref OP 057
COMPUTER OPERATOR — 2 years plus IBM. OS or DOS. Area Birmingham Salary c£3,500 Ref OP 053
COMPUTER OPERATOR — 1 year plus experience ICL 1900 2 shifts Area Staffs Salary c£3,200. Ref OP 042
IBM 370 OPERATOR — Age 19 plus. 12 months plus OS experience Area South Birmingham Salary to £4,000 Ref OP 028
COMPUTER OPERATOR — 12 months plus experience. ICL 1900 George 3 Double Day Shift Area South Birmingham Salary to £3,500 Ref. OP 026.
COMPUTER OPERATOR — 12 months plus ICL 1900 Manual or George II Area Halesowen Salary to £3,500. Ref OP 018
COMPUTER OPERATOR — 12 months plus IBM 370 under HASP or MFT. or RJE Area Worcestershire Salary to £4,000 Ref OP 006
SALES CONSULTANT. At least 2 years successful Track Record in selling Mainframe, Mini Computers, or Computer Peripherals Starting salary NEG to £7,000, plus commission bonus and Company car Area Midlands

Contact. Graham Aston, M.E.C.I.
MARTINS COMPUTER SERVICES, First Floor, Western House, Opposite Albany Hotel, Smallbrook Queensway, Birmingham B5 4HQ Telephone. 021-643 2111, 24-hour answering service.
We are now able to interview until 6 30 p m. and Saturday morning by appointment

ONE PHONE CALL

. . . will give you PROGRAMMERS, male or female, the opportunity to talk about your COBOL expertise and the way you avoid inefficiencies like treble subscripting.

Our Computer Centre at Bournville provides all main frame computing for Cadbury Schweppes' UK operations. Two IBM 370's using OS/VS1 with CICS/VS for teleprocessing are now utilising IMS DB/DC for data base processing and VSPC for interactive systems.

Although our main language is COBOL, we also use Assembler for CICS applications — training would be provided if necessary.

If you want to broaden your experience and work in an expanding on-line and data base environment contact me now and I will tell you about the current projects and opportunities to specialise.

Salaries will depend on experience, there are excellent company benefits and assistance with removal expenses is available if necessary.

Telephone me, Niall McCormack on 021-458 2000 extension 209 during the day or on 021-464 1929 after 6.00 pm at home.

Alternatively write to me at the Management Services Department, Cadbury Schweppes Limited, Bournville, Birmingham, B30 2LU.

Cadbury Schweppes

County Treasurer's Department
IBM 370/145 under OS/VS1

Chief Systems Programmer

Salary Scale £5,268 rising to £6,111 including phase 2 supplement

This post is at the head of a small team responsible to the operations manager for the maintenance and development of all systems software
Current work involves CICS applications and a large CRJE network with VDU, teletype and graphics terminals. The County Council has two PRIME mini-computers and is currently preparing for the installation, in district council offices, of three CMC REALITY minis. These will be used for on-line processing and communications with the mainframe which itself is to be replaced by a 3MB 3031 in early 1979.
Applicants should have at least two years' experience of systems programming and have undertaken the IBM OS internals course or its equivalent.

Trainee Systems Programmer

Salary Scale £2,983 rising to £3,773 including phase 2 supplement

Preference will be given to applicants who already have experience in basic assembler programming but full training will be given as necessary. There are also day release facilities for study leading to HNC and British Computer Society qualifications.
In the case of both of the above posts assistance may be given with removal expenses according to the Council's scheme.
Application forms available from and to be returned to:
The County Treasurer, P.O. Box 2, County Offices, MATLOCK, Derbyshire DE4 3AH. Closing date: 12th December, 1977.

DERBYSHIRE County Council

UNIVERSITY OF BIRMINGHAM COMPUTER CENTRE
SYSTEMS GROUP —

COMPUTER OFFICERS

The Computer Centre already provides a wide range of local and remote computing facilities to the University. These are now being further extended by the installation of a large dedicated interactive system for both teaching and research and also by participation in the development of the Midlands Universities Computing Network.

The Systems Group at the Centre will be actively involved in all aspects of these developments. Applications are invited for two posts of Computer Officer in this Group. Applicants should have several years' experience in systems software and/or hardware in a service environment, as shown by the successful completion of several projects. Expertise in graphics or in data communications would be advantageous, but other areas of specialisation may be considered. A higher degree is desirable, but clear evidence of previous work successfully completed is equally important

SALARY RANGE £2,904 to £4,611 (less to £3,837 plus superannuation under USS

Further information from the Assistant Registrar, Science and Engineering, University of Birmingham, P.O. Box 363, Birmingham, B15 2TT, to whom applications (three copies) including full curriculum vitae and naming 3 referees, should be sent by 16th December 1977

Please quote Ref: CW22.

FREELANCERS

Get a free winter holiday

Phone Penny
01-402 9355

ONE PHONE CALL

. . . will tell you SYSTEMS PROGRAMMERS (male or female) what it's like working in a small team in our Computer Centre at Bournville.

The Centre uses two IBM 370's under OS/VS1 with remote VDU's under CICS/VS. New developments include IMS DB/DC, VSPC, laser printers and mass storage together with MVS.

If you have software experience in IBM operating systems and like a good challenge then contact me now.

Salaries will depend on experience and excellent company benefits include assistance with removal expenses if necessary.

Telephone me, Don Whittingham on 021-458 2000 Extension 337 during the day or on 021-353 9101 after 6.00 p.m. at home.

Alternatively write to me at the Management Services Department, Cadbury Schweppes Limited, Bournville, Birmingham B30 2LU.

Cadbury Schweppes

OPERATIONS MANAGER

Due to internal promotion we have a vacancy for an experienced operations manager. The installation comprises a Burroughs B3700 medium system computer, operating in an on-line environment with and user terminals and full data communications facilities.

It is likely that the successful applicant will have a minimum of four years' operating experience with at least one year as a manager or superior in a medium sized Burroughs installation.

Duties will cover all aspects of computer operations including data preparation and data control.

Please apply giving full details of current position and salary to:

Mr. A. Cockerill, Personnel & Training Manager, Armitage Ware Ltd., Armitage, near Rugeley, Staffs.

armitage sharks — Armitage Ware Limited, Armitage, Rugeley, Staffs, WS15 4BT

MIDLANDS APPOINTMENTS

MIDLANDS
"NEW YEAR—NEW CHALLENGE"

PROGRAMMER ANALYSTS c£4,2k + OVERTIME + BENEFITS

We have been retained by our clients, a major International organisation, to recruit for the above appointments.

Their 10-year business plan sets out major growth objectives, and the programme of systems development and its world-wide implementation, presents a formidable professional challenge.

The successful applicant, whilst based in the Midlands would be actively engaged in the development of systems packages to meet identified requirements in various geographical locations throughout the world.

ASK YOURSELF THE FOLLOWING QUESTIONS

* Do you have approximately 12 months' COBOL programming experience?
* Are you capable of working with the minimum of supervision?
* Would you welcome the opportunity of an early move into a formal systems role?

If you can answer yes to the above questions and feel you could make a genuine contribution to our clients future systems development, contact without delay:
ANDY CARTER. 021-236 3781
REF. NO. CW/12/2

SPECIALIST COMPUTER RECRUITMENT LTD.
BIRMINGHAM 021-236 3781 FREEPOST
Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR
MANCHESTER 061-833 0676 FREEPOST
Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD
LONDON 01-935 0671 FREEPOST 6
Freepost 6, 102, Blandford Street, London W1E 1JZ

SCR

British Shoe Corporation
LEICESTER

Our Computing Services Division is based at our Leicester head-quarters where a twin IBM installation is used to provide professional development and processing services to an increasing number of companies within the Sears Group.

An IBM 370/3031 is on order which, together with an IBM 3650 Point of Sale system, will form the basis for a distributed data processing network for the group. We therefore have the following additional vacancies:—

DATA COMMUNICATIONS SPECIALIST c £6,250 p.a.+Car

An experienced specialist is required to develop the communications network for the Sears Group and advise development staff on the design and implementation of terminal based systems.
Candidates must have proven experience in development of a network based on IBM equipment.

SENIOR SYSTEMS ANALYST
Up to £5,500 p.a.

Applicants should have a minimum of two years analysis and design experience. Opportunities will arise for a limited amount of travel, mainly within the UK.
Career prospects are excellent and benefits first class, including generous relocation expenses to a low cost housing area, a progressive salary structure, contributory pension and free life assurance scheme.

Please write or phone (Ext. 501) for an Application Form to Group Personnel Manager,
British Shoe Corporation,
Sunningdale Rd.,
Leicester LE3 1UR.
Telephone: (0533) 871355

MINI-COMPUTER PERSONNEL

Computer Ancillaries (West Midlands) Limited, who market the successful range of Maxi Mini-Computers and Jacquard Systems, require experienced personnel to continue our expansion programme in the Midlands based from Birmingham.
All positions below are open to male/female who are capable of working on their own initiative and can make a positive contribution to the continued growth of Computer Ancillaries (West Midlands) Limited

SALES EXECUTIVE — c. £12,000
Experienced in VRC, Mini-Computers. Salary and Commission or Commission only schemes available Company car or car allowance

ANALYSTS/PROGRAMMERS — c. £3,500
Must be capable of writing programs in assembler and evaluating customer requirements. Company car or car allowance

COMPUTER ENGINEERS — c. £3,750
Experienced Electronic Engineers in V D U Disc Based Minis or television repairs. Software experience an added advantage. Company car or car allowance

SALES SUPPORT SECRETARY AND SYSTEMS DEMONSTRATOR — c. £2,500
Normal secretarial duties plus ability to demonstrate, instal and train operators on mini computers Company car or car allowance.
All the above positions carry the normal benefits associated with a large group company
For more information telephone Mike Escott Regional Manager, or write in confidence to

COMPUTER ANCILLARIES (WEST MIDLANDS) LTD.
Cornwall House, 31 Lionel Street, Birmingham B3 1AP
021-236 0784
Vacancies also exist throughout the U.K

Southern England.
Mr. I C. Skinner, Chairman
Computer Ancillaries
84 High Street, Egham, Surrey
07843 6465

Scotland
Mr S. Graham, Computer Ancillaries
103 Bath Street, Glasgow
041-332 9214

NORTHAMPTONSHIRE COUNTY COUNCIL

Assistant County Treasurer
Computer Services

£7248 to £7779 plus £312 and £208 pay supplements

The post falls vacant due to the impending retirement of the present holder.
The Council operates an ICL 1904S and is currently undertaking an appraisal of its computing requirements post 1980, when the existing machine will be replaced. In addition to extensive computer services for a number of County Council Departments, six out of seven District Councils in Northamptonshire have terminal links to the County's processor.
The person appointed, male or female, will be responsible for all aspects of computing within the Authority and applications are invited from persons of proven managerial ability, preferably gained in a Local Authority environment.
Application forms and further particulars from the Personnel Officer, County Hall, George Row, Northampton. Telephone Northampton 34833 Ext 5237, to be returned by 9th December, 1977.

Northamptonshire
Treasurer's Department

BERTRAM COMPUTER DIVISION
The experts in computer recruitment in the Midlands

SYSTEMS ANALYSTS

£4,500: large company with complex applications pursuing on-line, seek person with 2 years' experience in commercial environment. WOLVERHAMPTON.
£5,000. BIRMINGHAM firm making use of batch, real-time and on-line facilities needs person with 3 years' experience.
£5,000; production control expertise essential for large WORCESTER installation having other established commercial applications, and pursuing this area for group situation.
£4,750; Analyst/Programmer (RPG II) with 3 years' experience to act as projects controller with medium-sized Univac installation in SOUTH WORCESTERSHIRE.

PROGRAMMERS

£5,000: 2 years' experience COBOL/FORTRAN; for software house, time sharing through DEC. 10. BIRMINGHAM.
£3,800: ASSEMBLER with CICS for BIRMINGHAM firm.
£3,650: 2 years' experience RPG II or ASSEMBLER for complex and varied applications through IBM installation at WEST BROMWICH.
£4,500: 2 years' experience PL1 for commercial application through IBM. Will re-train from COBOL or ASSEMBLER.

Please ring or call in:
111 New Street, Birmingham 2 021-643 4433

Charles Barker Recruitment
Confidential Reply Service

Please send full career details and list separately companies to which we should not forward your reply. Write the reference number on the envelope and post to our Midland office, Kennedy Tower, Snow Hill Queensway, Birmingham B4 6UB

Programmer
West Midlands Up to £4,000

Our clients, who provide computer services for a substantial British group of companies, require a fully-trained programmer for their data processing centre in the West Midlands. Applicants (male or female) should have sufficient experience to be able to work without technical supervision. Age is immaterial, but a knowledge of RPG2 and/or assembler is essential. Benefits and conditions are in line with the usual large group practice.

Ref. M227

An Opportunity in Commercial Administration

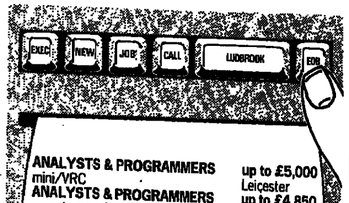
We are a major UK copper refinery engaged in extensive international trading commodity market transactions.
We wish to recruit a young executive of about 25 years of age to fill a new position in our commercial department. His/her first task will be to establish computer based systems for financial control and market intelligence and on its completion he/she will be engaged more generally in the work of the commercial department.
Thus the post provides an excellent opportunity to gain experience in a demanding but stimulating environment and the opportunity for extensive career development in the commercial and trading spheres.
The post should appeal to young accountants or system analysts interested in the commercial field who wish to broaden their business experience or to recently qualified graduates in economics or business studies.
Please telephone or write to the Personnel Manager, — Walsall 21292.

IMI Refiners Limited
James Bridge Copper Works
Darlaston Road, Walsall WS2 9SJ.

DATA PROCESSING MANAGER

WEST COUNTRY
SALARY—£ NEGOTIABLE

A leading workwear manufacturer, committed to an expansion programme, currently using an IBM System 3 is planning the installation of a SYSTEM 34 with remote terminals.
A Data Processing Manager is required with a solid background of systems analysis, at least 3 years' RPG II programming and a good working knowledge of IBM GSD equipment. Some managerial experience will be a distinct advantage.
The successful candidate will report to the Financial Director and play an important role in the development of the company's systems. Computer applications will include Sales Invoicing, Stock Control, Cost and Financial Accounting, Payroll and Production Control.
A generous salary will be offered commensurate with the importance of this position and the previous experience of the applicant, together with the other benefits of working for a progressive public company.
Applications in writing, with c.v., should be made to L. J. Baldwin, F.C.A., Clares Carlton Ltd., Wells, Somerset, BA5 1SQ.



ANALYSTS & PROGRAMMERS mini/VRC — up to £5,000 Leicester
ANALYSTS & PROGRAMMERS experience of PLI or BAL — up to £4,850 Lincolnshire
SYSTEMS ANALYST financial/production control systems — up to £5,500 Coventry
ANALYST/PROGRAMMERS — £4,500 Nottingham
SYSTEMS ANALYSTS financial/production control systems — £5,000 Derby
ANALYST/PROGRAMMERS — up to £5,000 Leicester
ANALYST/PROGRAMMER Real time systems, 2/3 years Fortran experience — up to £5,500 Mablethorpe & Daventry
SYSTEMS ANALYST financial systems — £5,000 Kettering

Over 100 other vacancies are available on our register from Lincolnshire down to Hertfordshire. To find out more please write or 'phone....

Ludbrook Management Services
Recruitment Consultants
1 Gallowtree Gate, Leicester. Telephone Leicester 26738.

ONE PHONE CALL

. . . will bring you information on exciting opportunities for **SYSTEMS ANALYSTS**, male or female, at our Computer Centre, at Bournville.
The heart of the Centre is two IBM 370's using OS/VS1 with remote VDUs under CICS/VS. New developments include IMS DB/DC and VSPC for interactive programming.
If you have commercial experience or a programming background and want to work in a company engaged in a significant expansion in on-line and data base systems contact me now.
Salaries will depend on experience and excellent company benefits include comprehensive sporting and social facilities, a pleasant location and open countryside nearby. Assistance with removal expenses can be given if necessary.
Telephone me, Niall McCormack, on 021-458 2000 Extension 208 during the day or on 021-454 1929 after 6.00 p.m. at home.
Alternatively write to me at the Management Services Department, Cadbury Schweppes Limited, Bournville, Birmingham B30 2LU.

Cadbury Schweppes

ARE YOU BORED??

Dissatisfied? Want a change?

If so contact

TRIDENT

the **PROFESSIONAL** contract agency

For HIGHER CALIBRE FREELANCERS

We are currently looking for all levels of

OPERATORS
PROGRAMMERS
ANALYSTS

for interesting and varied long and short term contracts in all areas of U.K. & W. Europe. Interviews arranged in

LONDON—CAMBERLEY—BIRMINGHAM

Please contact Bill, Gerry, Graham, Helen, Roy or Tony at

TRIDENT COMPUTER SERVICES LTD.

2115 Coventry Road
Sheldon, Birmingham B26 3EA
Telephone: 021-742 4431

Sentry House, 110 Frimley Road
Camberley, Surrey
Telephone: 0276 64252

Licensed by the Department of Employment as an Employment Agency and an Employment Bureau

Scientific Programmers

Rolls-Royce & Associates Limited is engaged in an extensive programme of design, development and procurement of nuclear propulsion plant for the Royal Navy's submarines. We are looking for programmers to work on the development of systems of scientific programs using both UNIVAC 1108 digital and analogue/hybrid (SIGMA5/EA17800) computers. There are also opportunities to work on other computers including:
IBM 370
MODCOMP II
DEC PDP11
GEC 90/2
IMLAC PDS4
The most commonly used language is FORTRAN, but assembly language is used for many of the small machine applications.
Applicants, male or female, should have at least one year's experience using a high level language and knowledge of an assembly language would be an advantage. A degree in an appropriate discipline is preferred, but is not essential. A generous assistance towards relocation costs is available.
Please apply in writing or by telephone for an application form to:—
The Personnel Manager
Rolls Royce & Associates Limited
PO Box 31
Derby
DE2 8BJ
or telephone Derby 51461 extension 3213

RR&A

HUNSBURY COMPUTER SERVICES LIMITED

A computer bureau formed in 1976 from the management services department of the Blackwood Hodge Group of Companies. We already have a number of clients throughout the U.K. and are currently engaged in a sales promotion. We are therefore looking for a

SYSTEMS ANALYST

for the expanding Systems Department. The ideal candidate will have had experience in a commercial environment, using ICL 1900 series, and especially with a knowledge of communications equipment. He/She must be capable of working to agreed completion dates, with a minimal amount of supervision. The projects concerned will cover both the enhancement of existing systems and the development of entirely new ones.

Salary is negotiable according to experience, and the Company operates a first-class pension and life assurance scheme. Please write giving full details of career to date to:—

Personnel Manager
HUNSBURY COMPUTER SERVICES LIMITED
Hunsbury Hill Avenue
Northampton NN4 9QT

SMALL IS BEAUTIFUL IN STAFFORD

You probably have at least three years experience in a large computer set-up and would appreciate a situation where people matter and with an opportunity for real responsibility and a secure career. We are Jan Shoes Ltd, our ICL System 10 is relatively small, we are the largest national footwear distributor in the U.K. and our business depends upon sophisticated in-stock information for hundreds of independent retailers throughout the country. We need a male or female

ASSISTANT COMPUTER MANAGER

who is capable of growing with the organisation and developing the department to cope with increasing sales volume and stock-turnover.

If you are in your mid-twenties, suitably experienced and can write in Assembler (or will convert) we can offer you excellent career prospects and a higher salary than you are getting now.

Write or 'phone in the first instance, giving enough details of age, experience and current earnings to make an application form unnecessary to Ken Burnett, Lee Jansen & Partners Ltd., 6 Lower Temple Street, Birmingham B2 4JD (021-643 0969) who is advising on this appointment. All communications will be held in strict confidence.

COMPUTER ENGINEERS U.K. — O.S.

Field / Site / Support
All systems go
£4,300-£10,500 p.a.

* stand by
* shift
* overtime
(according to post) car or allowance

E. B. STACK ASSOCIATES
Recruitment Consultants
Hoddesdon (08924) 62729

CONTRACT PROGRAMMERS
London
IBM 360 OS
COMPEX
(0234) 711717

CONTRACT PROGRAMMERS
RPG II VARIOUS AREAS
COMPEX
(0234) 711717

Appointments

LONDON
Steven Saad 01-261 8174
Mark Williams 01-261 8018
John Graham 01-261 8007
Anne Wilson 01-261 8094
Bill Ambrose 01-261 8484

MANCHESTER
Owen Kilby
061-872-5151

BIRMINGHAM
Alan Baker
021-356 4888

DatasolveDatasolveDatasolve

Knight Contracts

Programmers
4 years
experience or more?

We'd like to hear from you for contracts now and in the New Year. Our current requirements include:

IBM PROGRAMMER/ANALYSTS
MANCHESTER AND LINCOLN.....IBM OS COBOL
SURREY.....IBM ASSEMBLER & OS COBOL
N.W.1.....IBM OS & DOS PL/1
SURREY.....IBM DOS COBOL
BUCKS.....IBM SYSTEMS PROG. BTAM & TCAM

BURROUGHS
SURREY.....COBOL

To make an appointment or register your availability ring our consultants Richard Kaluzynski or Suzy Gillam on: 01-491 4706.

Operators
2½ years
experience or more?

We can offer you a wide range of contracts that will build your experience and lift your earnings. Here are some of our immediate requirements:

HONEYWELL 66/20 GCOS OPS | **URGENT**
HONEYWELL 62/40 GCOS OPS |
IBM OS VS1 OPS
ICL Gill OPS
HONEYWELL 66/10 OS 2000 OPS
IBM DOS & OS OPS
TERMINAL OPS

For further details or advice on these and other contracts still in the pipeline call Sue Smyth, June Mogg or Jane Asbury now on 01-491 4706.

Knight Recruitment

IBM programming experience

The best ways to use it, the best ways to get it.

We've a whole list of clients crying out for your IBM programming experience in COBOL or Assembler – or ready to train you if your background's in other hardware.
The jobs are with blue-chip companies – banks, oil companies, financial bureaus and institutions.
Locations range from the City and the West End to outer London, and even to Amsterdam. **Salaries range from £4000 up to £7000,** and benefits include low-cost mortgages and flextime.
There's bound to be a job that's right for you, so phone James Plummer for more information.
Ref. JP/117 London

IBM 370/135 Ops

Change up to c.£3200+22% shift allowance in West London

Major European car importer with a 370/135 operating under DOS/VS and Power has just switched to 3-shift working – hence the need for three new operators with 12–18 months experience. Really good prospects for promotion to shift leader. **Ref. AM/0074 London**

Honeywell Operators

£3000+30% shift allowance North London

Member company of a giant International communications group seeks two operators with 12–18 months Honeywell or other multi-processor experience to work a 3-shift system on a 60/60 and a 6000 under G-Cos. If you travel into London from the North, you could save yourself time and money – and give yourself better prospects of moving into senior operations, or even programming.
Ref. AM/0059 London

Senior Assembler Programmer

£4500 and an open door into systems

With at least 18 months Assembler programming, another 18 months or so could definitely see you moving into systems work with this Derbyshire-based bureau that provides DP services to an international textile group. By that time, you should have settled into the area – with relocation expenses paid.
Ref. B/082 Birmingham

COBOL Programmers

A better job–and a better standard of living

For a young programmer, the Milton Keynes area is a good place to live. There's plenty to do, plenty of young people like yourself, and housing costs are low. Our Client – a household name food company – is changing to a 2904 next year, so they need someone with around two years COBOL experience to develop a whole range of new systems. Salary is around £3500 – and that can go a long way in this part of the world.
Ref. B/065 Birmingham

Senior Programmer for systems development

£4200–£4700 Lancs

Successful engineering company, shortly upgrading to a 2960, is looking for a COBOL or PLAN programmer with 4–5 years experience, preferably in on-line work. Excellent career prospects in development work, easily accessible location.

Analyst/Programmers

£3800–£4200 or more plus overtime Merseyside

Electronics giant with wide range of ICL hardware seeks two analyst/programmers with payroll experience, preferably in an industrial environment. Real career prospects within sensibly structured department, easy travel for anyone local.
Ref. B/083 Birmingham

This is only a small selection of our current opportunities. There are a lot more jobs on our books for both men and women. For more details, please phone us on either of the numbers below.

01-491 4706
24-hour answer 'phone.
Knight Computer Services Limited, 14 Old Park Lane, London W1Y 4NL.

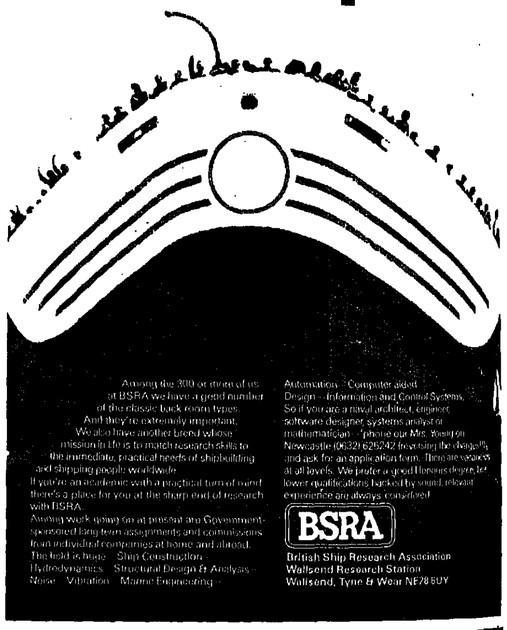
Knight

021-772 8331
Midlands Recruitment.
Knight Computer Services Limited, Woodlands Road, Birmingham B8 3BD.

Knight Computer Services Limited

Staff Services Division of BOC Datasolve Group and a member of Computing Services Association.

If you are an innovator...
...join us at the sharp end!



Among the 300 or more of us at BSRA we have a good number of the classic back room types. And they're extremely important. We also have another breed whose mission in life is to match research skills to the immediate, practical needs of shipbuilding and shipping people world-wide.
If you're an academic with a practical turn of mind there's a place for you at the sharp end of research with BSRA.
Among work going on at present are Government-sponsored long term assignments and commissions from individual companies at home and abroad.
The field is huge – Ship Construction – Hydrodynamics – Structural Design & Analysis – Noise – Vibration – Marine Engineering – Automation – Computer aided Design – Information and Control Systems.
So if you are a naval architect, engineer, software designer, systems analyst or mathematician – phone our Mrs. Young on Newcastle (0632) 625242 for using the dodge!!, and ask for an application form. Time we vacate at all levels. We prefer a good honours degree, but lower qualifications backed by sound, relevant experience are always considered.

BSRA

British Ship Research Association
Wallsend Research Station
Wallsend, Tyne & Wear NE28 6UY

Technical Instructors
—Computing

Salary c.£5000 — London

To expand our Training Department, we seek to engage Technical Instructors or Engineers with experience of Field Service or Central Systems maintenance.

An existing knowledge based on the DEC PDP8 and 11 series would be an advantage but the ability to communicate is essential.

Please send your curriculum vitae in complete confidence or telephone 01-353 7329 (24-hour answering service) for an application form to:

RECRUITMENT EXECUTIVE REUTERS
85 Fleet Street, London EC4P 4AJ

Further Appointments appear on pages
24, 25
26, 27

DATA PROCESSING MANAGER

SUSSEX — **c £6,000**

We have recently installed a Honeywell 62/20 disc based system.

A limited number of financial applications have been implemented, therefore the applicant should have sufficient experience on COBOL and systems analysis to develop and rapidly implement more.

This position could be the ideal opportunity for an experienced Programmer/Analyst to move into a managerial post.

Please send relevant details of experience to Mr. M. Pain at Clement Clarke Limited, Clement Clarke House, Springfield Road, Horsham, West Sussex. Tel. No. Horsham 6899.

JBA

Sales Executives
London based — **c. £10000 on quota + car**

A highly successful and well established mini computer manufacturer is expanding its sales team and is therefore looking for professional Sales Executives.
Candidates should have a proven sales record in the minicomputer or VRC field with a sound business systems background.
This is an exceptional opportunity to develop with an expanding organisation.
Excellent base salaries and fringe benefits.

Contact Jim Baker

Sales Support
All areas — **o.q. £9000+ (car)**

Several of our clients, notably mini-computer and peripheral manufacturing companies are rapidly expanding and urgently need sales support personnel at all levels.
Candidates must have sales or support experience and, in the case of executive positions, a successful track record. Naturally, ideal candidates will be self-motivated, assertive, and able to demonstrate an intimate knowledge of the d.p. industry. Anyway, we would like to discuss prospects with you.
Excellent base salary levels, generous commission schemes, and prestige cars.

Contact Mike Creamer

Systems Support Manager
Herts — **to £8000 + car allowance**

A major computer manufacturer with interests in a broad spectrum of industry wish to strengthen their management team by appointing a Support Manager with total responsibility for the systems support department. The successful candidate will ideally possess an extensive software and hardware background, with a proven record of managing a similar group. The company offers extremely rewarding and stimulating work, involving a high degree of personal contact at all levels.
Essential qualities of the appointee will be the ability to communicate ideas and have an inherent, positive and diplomatic personality.

Contact Margaret Stevens

Programmers & Analysts
London — **up to £6750**

A large and well established organisation, installing an ICL 2900 which will include real-time and database applications, has vacancies for programmers and analysts at most levels to work on the development of the system.
Programmers must have two years experience of PLAN or COBOL (or both) and Senior Programmers would be expected to have a wider background in both software and applications. Knowledge of GII or VME would be a positive advantage.
Systems staff should have a programming background which has been followed by several years in the design and implementation of real-time/database applications.
Training in ICL 2900 will be given where required.
Salaries according to experience. Challenging environment.

Contact Jim Baker

Consultant Analysts & Programmers
Minis and Micros — **£5000–£6500**

Opportunities exist with Consultancies and Software Houses for Analysts and Programmers with a minimum of 1 year's real-time mini and/or micro processor experience. We are particularly interested in people who have Assembler experience on DEC, Hewlett-Packard, Data General or Intel hardware. Applications are varied and include software development, commercial, scientific and process control. Most of the work is in the Southern part of the country, nevertheless applicants should be prepared to be mobile. Good career prospects, stimulating and friendly working environments.

Contact Margaret Stevens

Analysts & Programmers
S. England — **£4–5000+**

Good quality commercial systems analysts and programmers are sought by at least two of our clients in convenient locations. A background on any mainframe, particularly ICL or IBM, is desirable together with a willingness to engage in productive and creative development work.
We are more than willing to discuss your exact job requirements and location preferences if you call us.
Good prospects and career opportunities.

Contact Mike Creamer

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES
International Personnel Consultants
16 Maddox Street, London W.1. Tel: 01-491 4478

Tektronix®
COMMITTED TO EXCELLENCE

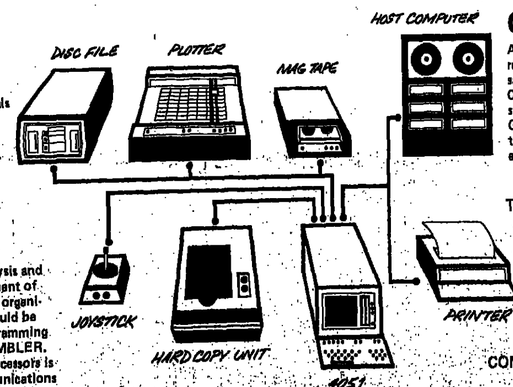
Join the World's Leaders in Computer Graphics.
Salaries commence at £6,000 for posts based at Harpenden & Manchester

PRODUCT MARKETING SUPPORT ENGINEERS

Responsible for hardware technical support of the company's range of Graphics Terminals and associated equipments. The successful candidates will possess a thorough understanding of user needs and systems applications and will be able to evaluate product configurations and provide a complete technical support service to the company's Field Sales Force.

SOFTWARE ANALYSTS

Specific functions will include systems analysis and advice on systems configurations. Development of applications software. Customer liaison and organisation of technical seminars. Applicants should be educated to Degree standard and have programming experience in BASIC, FORTRAN or ASSEMBLER. Experience of minicomputers and microprocessors is desirable together with knowledge of communications software.



OEM SALES EXECUTIVES

Applicants will have immediate responsibility for the running of established territories with substantial sales turnover. 2 to 3 years experience in OEM Computer sales is necessary together with an understanding of the huge market developing in Computer Graphics. Commercial negotiating ability with a technical understanding of Computer Systems is essential.

The positions described will suit candidates wanting to take more responsibility with a market leader.

All applicants should apply directly to MALLA SOFTWARE who will conduct interviews during December and January.

CONTACT: JOHN STALEY Ref: MS.12/19

Malla Software (Agy)
334 Euston Road, London NW1 3BG

Tel: 01-387 1603
01-388 2284

CREATIVE SYSTEMS ANALYST

A new appointment at Senior Management level is being created in the London Headquarters of a major fresh food company with a £50 million turnover.

The key task is to review and continuously improve the integrated mechanical management and control systems which have not kept pace with the expansion of the Group.

The emphasis is on the streamlining of overall information and ordering procedures to allow management itself to improve performance, and there is therefore unusual scope for a qualified and experienced analyst to demonstrate business judgement, originality and professional skill.

We require a proven success record in costing, budgeting and overall analysis (systems and techniques) both manual and computer based. We shall also be looking for experience in companies where the tempo is fast, the standards stringent and performance data demanding.

The salary is £8000 +, with attractive conditions of service.

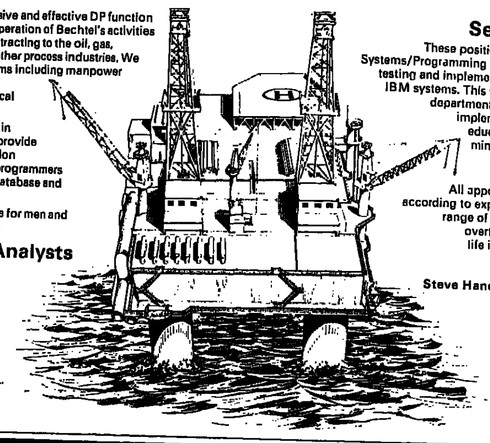
Applications from suitably qualified men or women should include a detailed curriculum vitae with salary progressions to-date and will be considered in complete confidence. They should be sent to Management Public Relations Limited at 45 Blackfriars Road, London SE1 8NZ.

D.P Professionals.

The provision of a comprehensive and effective DP function is essential to the successful operation of Bechtel's activities in the field of international contracting to the oil, gas, chemical, petrochemical and other process industries. We operate a wide variety of systems including manpower scheduling, materials control, accounting and invoicing, critical path analysis and many others.

With our growing involvement in major contracts we are able to provide considerable scope at our London headquarters for analysts and programmers including development using database and on-line techniques.

Our immediate requirements are for men and women to fill appointments as :



Senior Systems Analysts

Responsible for co-ordinating small project teams, specifying, designing and implementing new computer systems and maintaining existing ones. An 'A' level education is desirable together with at least four years' DP experience preferably on the IBM 360/370 using COBOL.

Senior Programmers

These positions carry responsibility, under the Systems/Programming Supervisor, for designing, coding, testing and implementing programs for Univac and/or IBM systems. This will call for close liaison with user departments in the analysis of DP needs and implementation of systems. An 'A' level education is desirable together with a minimum of two years' programming experience in either Univac 1100 or IBM 360/370 using COBOL.

All appointments carry excellent salaries, according to experience and there is an attractive range of company benefits including paid overtime, luncheon vouchers and free life insurance.

Write with full career details to **Steve Hancock at Bechtel International Limited, Bechtel House, 245 Hammersmith Road, London W6 8DP. Telephone 01-741 6304.**

BECHTEL

CLEVELAND COUNTY COUNCIL
Computer Services Unit

PROGRAMMER/ ANALYST

£1508-£4615 (includes supplements) depending on age, qualifications and experience

Applicants should be educated to a level of either Computer Science Degree or HND/HNC standard in computer subjects. The successful applicant will be engaged on the design and implementation of both batch and teleprocessing systems and a good working knowledge of ANS COBOL is essential. Experience of IBM OS/VSI and CICS will be advantageous.

The central installation comprises an IBM 370/148. A twin 370/138 configuration is on order for delivery next year. These machines support a sophisticated teleprocessing network servicing the requirements of four District Councils in addition to County Council Departments.

Application forms from the Director of Computer Services, 5th Floor, Rede House, 67 Corporation Road, Middlesbrough, Cleveland or phone: 0642 248155 Ext. 2351. Closing date 12th December 1977.

Bayer UK Limited is part of the international Bayer Group marketing a wide range of products in the industrial, medical, agricultural and consumer fields.

Programmer

An experienced RPGII programmer is required for our Richmond Headquarters to join the team providing DP Services to all locations in the UK. The current installation is an IBM 360/30 which is being upgraded in May 1978 to an IBM 370/115-2 with an RJE link to Manchester.

Applicants should be experienced in RPGII. There will be opportunities for further training in COBOL and Teleprocessing.

There is a good salary, free Life Assurance, Pension and the usual benefits of working for a successful international organisation.

Please write or telephone for an application form to:

BAYER

Personnel Department,
Bayer UK Limited,
Bayer House, Richmond,
Surrey TW9 1SJ.
Telephone: 01-940 6077.

Bayer thinks of tomorrow-today

CHEMICALS · RUBBER · POLYURETHANES
ENGINEERING PLASTICS · DYESTUFFS
TEXTILE FIBRES · CROP PROTECTION PRODUCTS
PHARMACEUTICAL / PHARMACEUTICALS,
DENTAL AND CONSUMER PRODUCTS
VETERINARY PRODUCTS

BP

Programmers

Geophysical Division

We require programmers for vacancies in our Geophysical Division in London and our Geophysics Research Branch at Sunbury-on-Thames. This latter Branch is expected to relocate to London within the next 18 months.

In London the work, involving the use of both Fortran and Assembler, consists of developing and maintaining new and existing software for processing seismic data. We have two Texas Instruments TIMAP systems which are dedicated to seismic processing and our programmers work in close liaison with the Geophysicists using this system.

In Sunbury the programmers assist Research Geophysicists in the design, development and application of data enhancement techniques in seismic prospecting. The work will be concerned with a general purpose system (UNIVAC 1110) and the TIMAP systems.

We are seeking applicants with at least two years' programming experience, preferably with a seismic system. A degree or equivalent in Maths, Physics, or Computer Science would be a definite advantage.

Starting salary will be competitive and related to age and experience. First-class fringe benefits include subsidised lunches, full sports and social facilities and non-contributory pension scheme.

Please write giving brief details of age, qualifications and experience quoting reference **FY.476**, to:
The Manager, Central Recruitment, The British Petroleum Company Limited, Britannic House, Moor Lane, London EC2Y 9BU.

unilever research

Scientific Programmer and Systems Analyst

Our Computer Section has the following two vacancies:

SCIENTIFIC PROGRAMMER
£3,000-£4,000 (Ref CH-414A)

Tasks: The Scientific Programmer will be part of the Programming unit (Manager and five programmers) who write, alter and maintain programs (mainly in FORTRAN, but some in COBOL) for a wide range of applications (from text handling to curve fitting) using data from an equally wide range (from pig-feeding trials to process monitoring). The Laboratory has a Harris/4 computer, using a virtual memory operating system and supporting 12 time sharing terminals, an analogue to digital converter, and acting as a RJE terminal to a 360/65.

Qualifications: BSc Honours Mathematics or BSc Honours in a Scientific Discipline (could be Computer Science) with demonstrable mathematical skills. Training will be given as necessary.

SYSTEMS ANALYST
(Instrumental Data Acquisition) £4,000-£6,000 (Ref CH-211M)

Tasks: 1. To be the primary contact in our Computer Section for existing and future users of data acquisition systems in the laboratory.
2. To investigate the feasibility of a computer solution to data-handling problems in the laboratory, and where necessary to specify a computer solution to deal with the problem.

Qualifications: BSc Honours Physics, Electrical or Electronic Engineering is required together with several years experience of data acquisition from instruments. Previous experience of microprocessors and of systems analysis would be a definite advantage.

Colworth Laboratory: Colworth Laboratory is a large, modern, very comprehensively equipped Food R&D centre servicing Unilever Companies in the UK (eg Batchelors, Birds-Eye, Walls) and abroad. It is situated in a pleasant country estate ten miles north of Bedford. Salaries and fringe benefits are at a level expected of a large international company and includes assistance with moving expenses where appropriate.

Please write quoting reference number and giving details of career history to:
Miss J. Kenny,
Unilever Research,
Colworth Laboratory,
Sharnbrook,
Bedford MK44 1LQ.

Systems Programmer

Addlestone, Surrey

An opportunity exists for a Systems Programmer to join the system support team at our Computer Centre at Addlestone. The Centre provides a 24 hour bureau service to the Company on its ICL 1900 computers running under George 3. The configuration comprises a 384K, 1906S and a 128K, 1907 shortly to be upgraded to a 1906A. RJE, MOP and TP services are provided.

Applicants should be fluent in a major programming language and have 1900 programming experience. A knowledge of George 3 would be an advantage.

A 3 shift system is worked. Salaries will be up to £4,500 plus 25% shift allowance. Facilities include a subsidised restaurant and an active Sports and Social Club.

Please write with brief details or telephone for an application form: Peter Steiner, Recruitment Manager, Plessey Radar, Addlestone, Weybridge, Surrey. Tel: Weybridge (0932) 47282.

PLESSEY

Remember when big software companies were still small enough for you to matter?

It's not hard to see why the software industry is so attractive to staff. There is the wide range of applications and computers. The high professional standards. Stimulating colleagues whose experience covers many technical disciplines. Above all, the satisfaction of being in an environment where the individual counts. Where career opportunities and progression are carefully matched to personal ability and where each man and woman sees the direct results of their efforts.

Unfortunately, growth can bring problems to even the best software company. At 300 professionals (give or take a few) the second tier of management arrives. The people at the top are that much further removed from both employees and clients. And for the really ambitious reaching the top has become harder. Later, at a strength of 400 to 500, many staff begin to feel that they might as well be in a company of 10,000.

Data Logic has 185 professional staff. We are big enough and financially secure enough to be credible for projects as large as any that our competitors can take on. We are still small enough to know whether a man in the lift is an employee or a visitor. Per capita we are probably the most profitable software company in the country. That demonstrates the quality of our project teams and management. It also matters directly to our staff, all of whom share significantly in the profits which they create.

We are growing steadily. Not uncontrollably fast, yet at a rate giving all of us at Data Logic the opportunities we want. We plan to grow even more as the vacancies below show. But we are still some way from that 400 mark. And when we get there we happen to believe we'll handle it rather well.

Come and meet us to judge for yourself. We think you'll agree.

Project Managers

For mainframe, minicomputer and mixed processor systems, usually supporting terminal networks. Increasingly, Data Logic's turnkey projects involve multiple, separated minicomputers.

Applicants must have at least 5 years implementation experience. They must have managed a sizeable project or have taken substantial team responsibility.

Database Consultants

To advise clients on the creation or upgrade of databases and to assist Data Logic teams in the design of retrieval systems. Projects will involve both mainframe and standalone minicomputer configurations.

Applicants should have experience in the design of record structures and have used at least one of the leading database packages such as ADABAS, IMS, TOTAL and DMS/2. Knowledge of banking or insurance is of particular interest.

Senior 2900 System Designer

For consultancy and implementation projects, with a bias towards large ICL 2900 models. Applications will include database systems and communications networks. Extensive knowledge is required of hardware capability, operating systems and standard software. The scope for application of this knowledge and for career progression will be considerable.

COBOL and PL/1 Analysts

For mainframe projects involving a variety of interesting and demanding applications, including banking, insurance, manufacturing and distribution.

Applicants should have 3-5 years analysis and programming experience. A sound knowledge of CICS will be an added advantage.

Minicomputer System Designer

For work at the forefront of the commercial application of small computers. The majority of projects will involve data communications and several systems now in their early stages include many interconnected processors.

Applicants should have at least 3 years design experience, preferably including system sizing and performance assessment.

Scientific/ Mathematical Programmers

Principally for real time minicomputer systems applied to analysis and/or control in scientific environments. There may also be some problem solving in high level language on mainframes.

Applicants should have a relevant degree in the mathematical sciences and one or more years practical experience in assembler or FORTRAN.

Digital Engineer/ Programmers

For design and development of systems incorporating custom-built devices such as interfaces and terminals with an emphasis on the use of microprocessors.

Applicants should have a degree in electronics or computer science and have programmed mini or micro computers at assembler or microcode level.

For mainframe assignments we are seeking knowledge of IBM 370, ICL 2900 and 1900 series, Burroughs B6700 and B3800, and Honeywell H6000.
For minicomputer projects, knowledge of Data General or DEC machines is preferred; although a background with any other leading make of small computer is of interest.

Data Logic offers four weeks annual leave, free insurance and a contributory pension scheme. Salaries are excellent and in addition all staff share in company profits. We pay particular care to career development with the aim that responsibility and technical skills progress as fast as individual capability permits.

Data Logic

Most vacancies exist in our London, Birmingham and Manchester offices. Telephone, or write indicating your preferred location, to:

W. D. Barrow
Data Logic Limited
FREEPOST
Westway House
320 Ruislip Road East
Greenford
Middlesex UB6 8BR
Telephone 01-578 9111

PROGRAMMERS

Salary range: £3,900-£4,800 p.a.

+ valuable free travel on London Transport at all times
+ good prospects of advancement

Data Processing plays a major integral part in helping London Transport to maintain its position as a world leader in urban transportation.

As an expanding department engaged on a wide range of activities we are still seeking top quality professionals. Programmers who sincerely want to get ahead can work with:

- ICL 1904S Series and 2903/4
- IBM 370/148
- Real-time extensive on-line systems
- Database development
- Distributed processing
- COM
- Computer typesetting

Appointments are normally made to Programmer grade but applicants with limited experience will be considered for Assistant Programmer posts (salary from £3,280).

If you have a good working knowledge of COBOL (possibly FORTRAN) and some experience in any of the above why not call our Chief Programmer on 01-637 9144 today to get more details. Otherwise write to the Staff Appointments and Development Officer, 55 Broadway SW1H 0BD, quoting reference 872/C.

LONDON TRANSPORT

CONTRACT Computer Operations Staff

Link your name with Dataskil

Our Operations Services Region has requirements arising daily for ICL experienced contract operations people with at least 2 years' relevent experience.

A selection of our current vacancies include:

- **1900 GEORGE 3 OPERATORS. LONDON, KENT & HERTS.**
- **1900 GEORGE 2 AND GEORGE 2+ OPERATORS. LONDON & HOME COUNTIES.**
- **2903 OPERATORS, OPERATIONS SUPERVISORS. ALL AREAS.**
- **SYSTEM 4 OPERATORS. LONDON.**
- **SYSTEM 4 DATA CONTROLLERS. LONDON.**

Broaden your horizons, register with us today. Call Richard Hornblow on Reading (0734) 581268 ext 46. Alternatively send career details to him at: Operations Services Region, Dataskil Limited, Reading Bridge House, Reading RG1 8PN. Please quote reference CW1605.

ICL Dataskil
The Computer Professionals

COMPUTER ENGINEERS

(mini hardware)

LONDON/BRISTOL/SCOTLAND

Salary £4-5k base + car + bonus + benefits

Competent computer engineers, capable of maintaining both 16 bit processors and associated peripheral devices, are required for our client, a US owned mini computer supplier.

You should have:

- ★ a minimum of 18 months' practical experience in computer maintenance, ideally on minis — academic qualification not over important.
- ★ a preparedness to work from home.

This is an excellent opportunity to move with the times, into, or within, the fast moving mini computing field. Initial product familiarisation will be given in continental Europe.

Interested applicants contact:
MANDY FLORENT on
01-935 0671

REF. CW/12/3

SPECIALIST COMPUTER RECRUITMENT LTD.
BIRMINGHAM 021-236 3781 FREEPOST
Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR
MANCHESTER 061-833 0676 FREEPOST
Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD
LONDON 01-935 0671 FREEPOST 6
Freepost 6, 102, Blandford Street, London W1E 1JZ

Computing Services Association

SCR

University of Bradford
ASSISTANT COMPUTER OFFICER/ COMPUTER OFFICER

Applications are invited from graduates or professionally qualified people for an appointment in the School of Control Engineering to work in a research group with on and off-line computers using BASIC, FORTRAN, CORAL etc and assembler languages. Advice on programming general programming work and the maintenance of documentation will also be involved. Opportunities exist for studying for a Higher Degree. Salary is on a scale £2,804 - £4,190 per annum (Assistant Computer Officer) or £2,804 - £4,811 (Computer Officer). Application forms are available from the Personnel Officer, Room E47, University of Bradford, Richmond Road, Bradford 7. Telephone Bradford 33466, ext. 253. Please quote reference CE/ACA/CO/CW.

PROGRAMMER INTERESTING REAL-TIME PROJECTS

D.E.C. Minicomputer based Systems.
Pleasant working environment.
Excellent opportunities for career advancement.
Commencing salary:
£3500 - £4500
Min. 1 year's experience
Phone:
Crosskeys (0495) 270671
9 a.m.-6.30 p.m. weekdays or Saturday morning.
Isca Electronics Ltd.
Crosskeys, Gwent
SOUTH WALES

SOUTH YORKSHIRE COUNTY COUNCIL
County Treasurer's Department

PROGRAMMER
Post Ref. T270
Grade APE/S (Salary £2881-£4815 inclusive of supplement)

Applications are invited from competent programmers with a minimum of two years experience of ICL 1900 series COBOL. A knowledge of ICL software and Group operating procedures is essential and some experience of PLAN and NCC TEMPO would be an advantage.

The County Council, with offices in Barnsley, has a 1928 ICL 1904S computer running under George 3 operating system with extensive MOP and communications. Applications range from conventional batch systems to those involving integrated database techniques and emphasis, wherever practical in the future, on terminal based systems.

Closing date will be 16 December, 1977.

PLEASE WRITE OR TELEPHONE FOR APPLICATION FORM (QUOTING THE APPROPRIATE POST REFERENCE) TO THE CHIEF EXECUTIVE (PERSONNEL) SOUTH YORKSHIRE COUNTY COUNCIL COUNTY HALL BARNSLEY S70 2PN TELEPHONE BARNSLEY (0226) 41 EXT 2108

GRAMPIAN HEALTH BOARD
COMPUTER DEPARTMENT

ANALYST/PROGRAMMER

An Analyst/Programmer with at least three years of computing experience is required to join an experienced team working on the development of a medical information system for the Grampian Health Board, using database techniques. The computer building is situated on the main Aberdeen hospital site at Foresterhill.

Two systems are currently in operation on a CTL Modular One.
(a) production of summaries of patient information for outpatient clinics.
(b) a waiting-list system with automatic calculation of admission dates.

A knowledge of database techniques and Fortran is desirable, as are formal qualifications, but more important are ability and experience.

SALARY: £4038-£4884 per annum, inclusive of earnings supplements. Four weeks' annual leave, nine days' public holidays, modern, custom-built office accommodation, excellent canteen facilities.

Applicants with less than the required experience may also be considered, with appointment initially on a grading with the salary scale £3153-£4038.

Application forms and further particulars of the post are available from the: Area Personnel Officer, Grampian Health Board, 1-7 Albyn Place, ABERDEEN, to whom completed applications should be returned by Friday, December 16, 1977.

ASSISTANT D.P.M.

West Midland Farmers' Association Ltd. is an Agricultural Co-operative with an annual turnover of £50m. They run a 2900/20 DPA using Data 1 sub-SIS. A number of applications are currently being run, and it is envisaged that many more Management Information Systems will be required in the near future. The successful applicant will have a proven knowledge of RPG, preferably gained on a similar machine. A knowledge of COBOL would be an advantage.

Write with CV and salary required to: J. D. Banning, Computer Manager, West Midland Farmers' Association Ltd., Head Office, Merchants Road, Gloucester.

CAPITAL APPTS.
COMPUTER SERVICE ENGINEERS
Phone for free jobs lists all areas
SALARIES TO £8,000
637 5557 day, 995 0668 eve.
3A Percy St. W1 — London W1

ANY GOOD AT MODEL MAKING?...

.....We, of course, mean computerised business models!

If your answer to the question is Yes, we could offer you an interesting career opportunity in our recently formed Medium/Light Commercial Vehicle Division, based in Edinburgh.

The new division is just establishing its Financial Planning systems and we are keen to build computerised modelling techniques into our ways of working. We are consequently seeking an experienced modeller to take total responsibility for investigating the possible applications, identifying appropriate techniques and co-ordinating their implementation.

Job satisfaction should be no problem. The scope and challenge of establishing a new function will ensure this. However, your skills must match the challenge. You will need to demonstrate a combination of technical expertise and the necessary communication skills to explain and sell your ideas to other, perhaps non-technical, managers. A basic knowledge of financial theory is obviously advantageous.

The rewards will reflect the importance we attach to the position and will include excellent salary and conditions together with eligibility for the Company's Car Lease Scheme. Relocation expenses will be paid where appropriate.

Please phone or write, giving career and salary details, to:

Leyland Truck & Bus

B. Strawson
Staff Planning Manager
Leyland Truck & Bus
Medium/Light Division
1 Wester Hailes Centre
EDINBURGH EH14 2ST
Telephone: 031-441 5141

POSITIVE PROGRESSIVE PERMANENT

These are the simple criteria our client expects from their staff.
To achieve this, our client recognises that it is their responsibility to provide the necessary facilities.
Based in S.E. London, they take a very **positive** approach in making their present Data Processing function a **progressive** installation.
Using IBM 370 hardware, they are now looking towards future development which will cover both on-line and real-time areas, and probably the introduction of a Database for Financial systems.
To achieve their aims, they need **permanent** staff for the following vacancies.

SENIOR SYSTEMS ANALYST

Starting salary up to £6055 p.a.

To clearly interpret user requirements, to do initial investigation and to direct teams in effective implementation — these are the required attributes. Applicants should have gained this experience preferably in the financial systems area. Ref. 1059.

SYSTEMS ANALYSTS

Starting salary up to £5797 p.a.

With sound analysis and design experience preferably on Financial systems and a commercial programming background. This is an excellent opportunity to obtain project responsibility and to progress to full project leadership. Ref. 1060.

SENIOR PROGRAMMERS

Starting salary up to £5797 p.a.

Who have obtained in-depth experience of COBOL in an IBM 360/370 installation. Additional experience of BAL would be a distinct advantage.
Applicants will be given full team leadership responsibilities for programming teams. Ref. 1061.

PROGRAMMERS

Starting salary up to £4900 p.a.

Who have a thorough understanding of COBOL in an IBM 360/370 environment. Ref. 1062.
Salaries will be negotiable according to your experience. Our client is able to offer excellent working conditions, an environment where you can develop your skills and benefits, which include up to 29 days holiday.

For further information, please contact Marilyn Black quoting the appropriate reference number.

Computing Services Association

WE ARE ALWAYS INTERESTED IN HELPING YOU WITH YOUR CAREER
John Goldsmith (Computer Recruitment) Ltd., 15 Buckingham Palace Road, London, S.W.1
Tel: 01-828 5356 — 24-hour answerphone service

JOHN GOLDSMITH (Computer Recruitment) Ltd.

OS PROGRAMMERS

With ambition to move to ANALYSIS

£5000/£7000

VICTORIA, LONDON SW1

Improve both your earnings and DP knowledge. Our Clients are a large international marketing organisation, currently in a major systems development phase, including IMS Real Time projects.

Due to expansion, we have been retained to recruit for several posts. The appointments offer:

- *excellent earnings and fringe benefits*
- *progression to analysis work, with the stimulation of liaison with user departments*
- *training in advanced techniques*
- *good career path — possibly to a non-DP management position in due course.*

The opportunity will interest well educated programmers (preferably degree level) with an IBM OS background of upwards of two years, including COBOL or PL/1. Experience in the areas of real time programming or database design would be an advantage.

Relocation assistance will be given.

Please ring us for a preliminary confidential exchange of information, quoting ref. 777w. Messages will be recorded after hours.

Tel: 01-637 5796

EDP Systems
52-53 Margaret Street
London W1N 7FF

Programmer

We are looking for a programmer with a minimum of one year's experience in a commercial environment with a knowledge of Assembler, preferably that of ICL (Singer) System Ten, to replace our present programmer who is leaving us at the end of March, 1978.

The successful applicant, who will be responsible to the Group Accountant will be required to undertake full responsibility for programme development and file security.

If necessary, he or she will be required to attend a two week ICL Basic Programming Course for System Ten at the end of January, 1978.

A generous salary and fringe benefits are offered.

Please telephone or write to: The Group Accountant, Marshall-Andrew & Co. Ltd., P.O. Box 308, Bruce House, Black Prince Road, London SE1 7SL. Telephone Number: 01-735 9155.

Systems Support Professionals

New positions in our expanding environment

ITT Business Systems, European leaders in computer based data communications, need experienced systems support professionals to fill new positions based in their District Regional Offices at Manchester, Birmingham and North London.

You should work closely within the Systems Support Group giving software and technical support to the Sales Force.

We would expect you to have at least 4 years' computer experience, two of which should have been involved in systems and TP application. We would be particularly interested to hear from people currently working as systems engineers or systems programmers in any IBM teleprocessing environment.

We are making a considerable impact in the data communications market and have recently launched products such as the IBM compatible 3805 Programmable, Communications Controller and the 3630 intelligent data terminal. Our product range is wide and varied.

Our salaries reflect the importance of these positions and a choice of Company Car would be given plus excellent fringe benefits.

If you are interested in discovering more about these positions telephone Bill Bain, Systems Support Manager on 01-440 4141 ext. 610 or write giving brief career details to Gordon Green, Recruitment Manager, ITT Business Systems, Diversey House, 1A Chalk Lane, Cockfosters Road, Barnet, Herts.

ITT Business Systems ITT

CARL ZEISS JENA

DATA PROCESSING MANAGER — BOREHAMWOOD

c. £4,500 - £5,000 p.a.

CZ Scientific Instruments Ltd.

Distributors of Scientific Instruments and Photographic Equipment

We are currently a user of on-line bureau services and in May, 1978, will be transferring the bureau work to a Honeywell Series 60 in-house machine. Consequently we immediately require a Systems/Programming professional who is looking for the additional responsibility of controlling a complete installation.

The initial task for the successful applicant will be the establishment of a capable D.P. department to control the transfer of our invoicing, Sales Ledger and Stock Reporting systems to the new Honeywell 62/40 with seven Visual Display terminals. Once the new system is running the D.P. Manager will be responsible for the day-to-day control of the department and the development of new systems.

Applicants should have a sound knowledge of Systems Analysis and programming with at least 3 years' experience of COBOL. Series 60 Level 62 and on-line processing experience would be an advantage but is not essential as training will be available.

The position will be based in Borehamwood, Hertfordshire

The starting salary will be at least £4,500 p.a. but could be more for the right person. We also offer a non-contributory Pension Scheme and Life Assurance, and excellent working conditions.

Applications giving age, career details, current salary, and earliest starting date should be addressed to:

The Chief Accountant, C.Z., Scientific Instruments Ltd. P.O. Box 43, 2 Elstree Way, Borehamwood, Herts. Tel. 01-953 1688

CRANFIELD INSTITUTE OF TECHNOLOGY

Invites applications for appointment as

PROGRAMMER

in the Computer Centre which has an ICL 1903T computer with EDS 60 backing store operating under GEORGE 2 and MAXIMOP

The person appointed should have a working knowledge of FORTRAN (experience of ALGOL 68 would be an added advantage), preferably in an ICL environment

The job includes assisting users in an advisory capacity, package and general software development

Starting salary at the lower end of the academic-related scales 1B or 1A currently £2,904-£4,811 or £3,333-£5,627, with phase 3 increase pending

Further information and application form can be obtained from: The Employment Office Cranfield Institute of Technology Cranfield, Bedford MK43 0AL quoting ref: 872/D (closing date for applications 22nd December 1977)

CAPITAL APPTS. (London, W.1. 29 Wardour St.)

FORTRAN PROGRAMMERS

Urgently required for Industrial and Scientific Development. £3 000-£8,000 ALL AREAS

Telephone for free list of VACANCIES

637 5551 day; 636 9659 eve.

NEW BIRMINGHAM AND NORTH LONDON SALES OPPORTUNITIES

Eurocom Data Limited

A member of the National Westminster Bank Group

SALES EXECUTIVES

(To market COM Service)

Realistic on Quota Earnings

CIRCA £7000 + CAR

(Basic £4000-£5000 + Commission)

Eurocom Data Ltd, is a fast growing international Computer Output on Microfilm Bureau providing services through 6 centres in the U.K and 6 further centres in Europe via Eurocom Data (Holdings) Ltd

Suitable candidates are likely to be successful VRC Bureau Salesmen who have a good working knowledge of Computer and Business Systems, and have consistently achieved Quota

SYSTEMS ANALYSTS

We would be interested to hear from experienced systems programming personnel who would like to move into a sales environment. Full training will be given.

Application to

The Personnel Manager
EUROCOM DATA LIMITED
3 High Street, Rickmansworth, Herts.
Tel: Rickmansworth 74323

NIGHT Shift on New Year's Eve?

Meet the New Year with CHEERS!

OPERATORS ***£2,800 + S.A. + BONUS***

Apply now! — You could start work for a progressive company in January. You will work on a growing Honeywell 64 site in Blackburn. 2 Shifts are in force — NO NIGHTS! TP has recently been introduced and this is YOUR OPPORTUNITY TO BROADEN YOUR EXPERIENCE.

To enter into the spirit you must be an experienced operator, preferably with a Honeywell background, using GCOS or OS 2000; however any re-training will be given if necessary. You must have the ability to adapt to changing situations and capable of liaising with remote users where necessary.

Whitbread is a well established organisation and will actively offer you career development within the group. A wide range of benefits is offered with an annual bonus. For more details contact MANCHESTER, quoting ref; CW68-7M.

WHITBREAD WEST PENNINES LIMITED

As an Operator at the Tower

You'll need to keep your head

You'll be an important member of our Data Processing team if you join us here at the Tower, a major international luxury hotel overlooking the river and right by the historic Tower of London.

We're looking for a young man or woman aged 18-20 to operate our PDP machine and list and update computer data relating to a wide variety of hotel accounting and stock control applications. Hours will be 10 a.m. - 6.30 p.m. Monday to Friday with limited on-call liability.

PDP machine experience is desirable but we are prepared to train a recent school or college leaver who has a minimum of 'O' levels in English and Maths.

Salary will be around £2,800 per annum With an attractive range of benefits. Please write or telephone with details of experience to the Employment Office, The Tower Hotel, St. Katharine's Way, London, E1 9LD. Telephone: 01-481 2576.

JUNIOR ANALYST

£4,630 - £4,990

Applicants should have had some experience of system design and programming and be now considering extending their careers into systems investigation and analysis. A minimum of two years' experience is required.

PROGRAMMER

£4,161 - £4,507 or £4,630 - £4,990

Applicants should be experienced programmers, having a minimum of two years' COBOL experience.

Salary determined by experience according to a career scheme.

These vacancies exist in recently initiated project teams. The Council is currently transferring its workload from an ICL 1900 to a UNIVAC 1106, as well as developing new applications. Experience of this equipment is not a pre-requisite as appropriate training for this and in the installations standards will be given.

Relocation expenses and temporary accommodation, available in approved cases. Excellent staff club, car parking and restaurant facilities.

For both posts please write comprehensive personal and career details to: Head of Computer Services, County Hall, Kingston-upon-Thames KT1 2DN, or ring 01-546 1050 ext. 3479 for further details. The closing date for applications is ten days from this advertisement.

SURREY COUNTY COUNCIL COMPUTER SERVICES

Metropolitan Borough of Wigan
WIGAN (TERTIARY) COLLEGE OF TECHNOLOGY—DEPARTMENT OF MATHEMATICS AND COMPUTING

LECTURER GRADE I in COMPUTER STUDIES

Required as soon as possible, a qualified person with good industrial and/or commercial data processing experience to lecture on a wide range of computer studies courses. Salary £2,499-£4,377 plus supplements of £312 and £132 — £180.

Further particulars and application forms from the Chief Administrative Officer, Wigan, WN1 1RR, within 14 days of the date of advertisement.

informatix

PERMANENT OR CONTRACT NETHERLANDS &/OR LONDON

Our client, a leading systems and software development group, have retained Informatix to assist in recruiting the following personnel for the U.K. and Netherlands.

PL/1 OS/DOS PROGRAMMERS to £7,500

Candidates should have 2-3 years' or more PL/1 programming experience under OS or DOS. A combination of both will be considered an added advantage. These posts are Central London based.

PL/1 IMS/DB/DC PROGRAMMERS to £17,000 + Tax Subsidy

These positions are permanent or contract and based in the Netherlands. Successful candidates will have had not less than two solid years of IMS experience using PL/1 and hopefully DL/1. T.S.O. could be advantageous but is not a prerequisite. Every assistance in moving to Europe will be given, including paid accommodation, and all expenses associated with resettlement.

COBOL ICL 1900/2900 PROGRAMMERS to £7,500

To be based in a convenient area of West London. Successful candidates will have not less than three years' solid COBOL programming experience in an ICL 1900 environment under either George II, III or IV. Any Plan experience will certainly be considered as a plus Analyst/programmers are also required for this important project team.

In addition to above market salaries our clients also pay generous project bonuses and operate a profit-sharing scheme. Numerous other fringe benefits provide for a total package which we believe to be unbeatable.

Interviews will be held in London from Dec. 1 through Dec. 14 and it is anticipated that successful applicants will be made offers within 48 hours of interview.

Ref: 48/20

Informatix UK & O'seas Index Phone 01-831 6055

Informatix 24 Grays Inn Road London WC1X 8HR Telex 28800 LONDOF G

informatix

POSITION	SALARY	EMPLOYER	LOCATION	HARDWARE ENVIRONMENT	SOME OF THE QUALIFICATIONS	REF. NO.
PL/1 or COBOL Analyst Programmer	c. £7,500 + Travel Exp.	Software House	Central London	IBM 370/OS	Whilst PL/1 and or COBOL are essential, willingness to travel on business extensively at times is the priority.	48/1
PL/1 CICS Programmer	c. £6,250 + Mortgage	Financial Institution	North London/ Herts.	IBM 370/OS CICS	Senior PL/1 Programmers ideally with exposure to CICS will be enthused by these excellent posts.	48/2
Message Switching	Minimum £6,000	Communications	London	PDP 11	Major British Communications Group active throughout U.K. and overseas requires exp. Message and/or Packet Switching people, as well as good communication specialists.	48/3
RPG II Programmers Analyst/Progs.	c. £5,500 + Travel exp. + Bonus + P/S	Software House	London & South	ICL 2903 IBM System 3	Travelling to and around London on Commercial Projects. Opportunities for advancement. Benefits include excellent Bonuses and Profit Sharing.	48/4
Programmer/ Analysts	£5,300 + Mortgage	Banking	City	IBM S.3 System 32	Sound RPG II programming experience. Preferably on System 3 or System 32. Any Banking background an added advantage.	48/5
Mini Systems Programmer	c. £11,000 + Tax Allowance	International Systems & Software Group	Based Holland	D.G. Interdata PDP, etc.	Mini systems + Software specialists urgently required to be based in AMSTERDAM.	48/6
RPG II Programmer	c. £5,000 + Top/ Benefits	Management Services to Int'l. Group	West London	System 3	Ideal opportunity for experienced RPG II Programmer wishing to expand into large IBM Mainframe applications with exposure to sophisticated on-line Systems.	48/7
Team Leader	c. £6,200	Major Manufacturing Group	N.W. London	ICL 1900/2900	Plan and or COBOL in an ICL environment essential. Important post with development potential.	48/8
Assembler and PL/1 Programmers	c. £6,750 + Overseas Allowance	Software House	U.K. or Europe	Series 1 & 370/OS	Ground floor opportunity to establish expertise with IBM's new series 1 computer. Excellent overseas conditions.	48/9
PL/1 Applications Programmer	c. £5,600 + Mortgage	International Banking Corporation	East London & City	IBM 370/OS CICS & IMS	Sound PL/1 experience essential; any exposure to CICS or IMS will be an advantage. Training.	48/10
BAL Systems Programmer	c. £5,000 + Mortgage	Insurance	N.W. London/ Middx.	IBM 370/DOS	Rapidly expanding D.P. dept. offers genuine advancement opportunities to right persons.	48/11
Systems Analyst	c. £6,750	Re-Insurance Group	Croydon	IBM 370/OS or DOS/VS	Analysts with three yrs. + exp. ideally with solid IBM background, might suit Analyst/ Prog. with COBOL exp. Strong Team Person needed.	48/12
IMS Applications Programmer	to £5,500 + Al Benefits	Management Services to Int'l. Group	West London	IBM 370/MVS	Two years + IMS DB/DC ideally using PL/1. One of the foremost installations in U.K.	48/13
PL/1 Applications Programmer	c. £5,000 + Mortgage	International Banking Corporation	East London & City	IBM 370/OS CICS & IMS	Sound PL/1 exp. essential, any exposure to CICS or IMS will be an advantage. Training given.	48/14
Analyst Programmers	£14,000 + Accommodation	International Airline	Middle East	IBM OS	Very exciting opportunity for person with Sound Inventory Control experience and/or IPARS (or Equivalent).	48/15
PL/1 IMS Analysts & Programmers	Negotiable but High	Management Services Facility	South Coast	IBM 370/OS	Ideal locality with first class job interest and opportunity to develop into IMS and database development.	48/16
IMS Analyst Programmer	to £6,600 + Benefits	Management Services Facility	North London/ Middx.	IBM 370/OS	IMS DB/DC experience essential, preferably using PL/1. COBOL possible alternative. Very professional D.P. department.	48/17
Senior Recruitment Consultant	Basic £6,000 + High Comm.	Informatix	Central London	—	Computer Recruitment experience is essential. Aggressive and determined consultants will earn top rates in this field.	48/18

NETHERLANDS

MINI PROGRAMMERS ANALYSTS & CONSULTANTS

GR.1 c. £11,500
GR.2 c. £13,500
GR.3 c. £15,000

Our clients, market leaders in Systems and Software Development, with regional headquarters in Holland, are embarking on a further expansion programme for which they require numerous additional personnel. In particular they wish to recruit mini software and applications specialists, analysts and senior analysts and consultants with in-depth experience in any of the following areas:

- ★MESSAGE SWITCHING
- ★DATA COMMUNICATIONS
- ★COMPUTER NETWORKS
- ★MINI COMPUTER SOFTWARE

Assembler level programming experience is of primary importance and candidates will be expected to demonstrate enthusiasm towards the prospect of settling in Holland for an extended period. All removal expenses, initial accommodation, etc., will be met in full by our clients. Interviews will be held in London as soon as possible and offers will be made to successful applicants by no later than mid-December.

Ref: 48/19

occ computer personnel limited

Manchester Stevenage & London

System Ten & 1500 Series

Opportunities exist for candidates to join a leading computer manufacturer in the areas of pre and post sales support and development. Projects will include the development of special application packages for 1500 series and point-of-sale equipment.

Technical Consultant — to £8,000

This senior position, based in London, will involve pre sales and installation of larger customer contracts, together with responsibility for directing support staff. A practical knowledge of communications is essential, preferably on System Ten and 1500. Experience of other mini and mainframe computers would be an advantage. **Ref: 103/CW.**

Pre and Post Sales Support — to £7,250

Based in Manchester or London, duties will involve package promotion, installation and some production. An Analysis or Programming background would be useful together with a knowledge of communications. Experience of System Ten, 1500 Series, Key Edit, or Scan Optics is desirable, although full training will be given. Package development experience would be particularly relevant. **Ref: 104/CW.**

Development Support — to £6,500

These vacancies are based in Stevenage and are concerned with the development of packages, initially for the 1500 series and point-of-sale. Candidates must therefore have a practical knowledge of 1500 programming, preferably in ASSEMBLER and CDE. For one of the vacancies communications experience would be desirable. **Ref: 105/CW.**

This international organisation offers long-term career prospects in the areas of Consultancy, Management or Sales. This is also an opportunity to gain experience on new machines in a variety of application areas.

To apply for any of the above positions or for further information, please telephone or write to Renée Nute and Sandy Lloyd on 01-242 9366. If it would be more convenient to telephone in the evening, the telephone numbers are: Renée Nute, 01-874 6372; Sandy Lloyd, 01-691 5168.

Computing Services Association

H. VETH b.v. The Netherlands

Consulting Engineers, Architects and Computer Specialists

urgently require for their offices in Dordrecht an

EXPERIENCED TECHNICAL PROGRAMMER

for Harris slash 5 system with disc drives, magtape unit, line printer and plotter.

Job description:

—system analysis and programming for the structural construction department (steel and concrete) for automization of design — and drawing activities. We intend to integrate product specification (shop drawings, etc.) and materials-management.
—software programming for a Calcomp — 936 plotter.

Education:

preferably at poly-technical level.

Experience:

—applicants should have at least two years' experience as a Fortran programmer.
—applicants having worked within a steel-construction company, design department or production management are preferred.

Dordrecht is conveniently situated near Rotterdam. The office is at walking distance from the main railway station Dordrecht.

Assistance can be given towards finding suitable accommodation arrangements regarding weekend trips home can be made.

Remuneration and fringe benefits are attractive.

Apply in writing to,

The management of H. VETH b.v.
P.O. Box 274, Spuiweg 182, Dordrecht (The Netherlands)

---

up to £11,000

DP Sales

some facts to change your future

★ 2,000 Olivetti TC 800 systems will provide banking service in Japan
★ 1,400 Olivetti TC 800 terminals update a Canadian banking network
★ Over 80% of Australia's banking terminals are supplied by Olivetti
★ 1,300 West German banks prefer Olivetti TC 800 intelligent terminals

As an experienced DP professional you will be used to talking hard facts and figures to get your message across, and you will be impressed by solid achievements like these.

Worldwide totals of Olivetti systems in use are: 140,000 data processing systems and personal minicomputers; 65,000 terminals and data collection units; 150,000 teleprinters and telecommunications units; 230,000 accounting machines. If all adds up to a record of success in which you could share if you are already working in the computer field.

We need experienced DP professionals of degree calibre who can take advantage of the TC 800's distinct cost advantages and multiple order sales which can mean making a 'small fortune' in performance-linked commission. If you've sold systems before so much the better, but systems experience in the banking, accounting or special commercial market would provide a firm base for a successful sales career with us.

Very attractive negotiable salaries vary between £3,500 and £7,000, and earnings between £8,000 and £11,000, depending upon experience. Contact your local Olivetti Regional Personnel Manager for more information and a personal history form.

For London: Murray Fraser, British Olivetti Ltd., 105 Watling St., Milton Keynes, Bletchley.
For Bristol: Jim Chester, British Olivetti Ltd., 40 Berkeley Sq., London W.1
For Birmingham & Manchester: Bob Buckingham, British Olivetti Ltd., 32 Brompton St., Manchester, M1 8 NN
For Glasgow: Jim Edward, British Olivetti Ltd., 90 West Nile St., Glasgow, G.1.

olivetti

Consider Olivetti first.

THE OPEN UNIVERSITY

PROGRAMMER/ANALYSTS
in the Student Computing Service

The Student Computing Service maintains a large national time-sharing network using Hewlett-Packard and DEC20 computer systems.

We provide a challenging environment for programmer/analysts wishing to design and implement educational computer packages. We service a wide variety of courses in computer science, mathematics, physical and social sciences, engineering and education. Currently we require two graduates with at least three years' experience in scientific or educational computing: additional experience in data processing would be an advantage. We are also looking for a more recent graduate in computer science as a trainee.

Initial salary, depending on age and experience, will be on one of the scales £3,119 - £4,190 or £3,975 - £5,219, but negotiations are nearly completed to convert these ranges to £2,904 - £4,811 and £2,904 - £5,627. In addition, a salary review is pending with effect from 1.10.1977.

Application forms and further particulars are available, by postcard request please, from The Personnel Manager (PA1), The Open University, P.O. Box 75, Walton Hall, Milton Keynes, MK7 6AL, or by telephone from Milton Keynes 63868. Closing date for applications: 4th January, 1978.

Come West and live!

Salaries c £3.5K-£6.5K+

Vacancies exist for all levels of computer personnel in locations from Worcestershire to Devon and Swansea to London

Many of our clients are expanding and installing new equipment incorporating the latest techniques providing excellent opportunities for career progression.

Specifically we need:

Programmers, Analysts/Programmers Analysts up to Project Leaders

Applicants should have personality and the ability to grow through learning new techniques with our expanding clients. A sound education and background of at least one year's experience is necessary.

Please phone now: Bath 317890.

Walker-Weston Associates Limited, Specialist Computer Recruitment, Woodlands, Lower Bristol Road, Bath, Avon. Tel: Bath 317890

MINI + MICRO PROGRAMMER/ ANALYSTS

£4,000 —£6,500

The Scientific and Technical Systems Division of JOHN BELL Computer Services Ltd is part of a progressive and expanding systems and software house with offices in Central London and Farnborough (Hants). We are currently involved in a variety of Commercial Real-time, Avionics, Military and Communications applications both in the UK and overseas, involving ASSEMBLER, CORAL 66 and FORTRAN programming, design and specification work for various MINI and MICRO computers.

We are now seeking project team members and potential team leaders with at least one of the following qualifications:

★ 1976 Computer science degree
★ Graduate with 2 years' plus experience
★ General capability and adaptability
★ MACRO-11 or RSX-11/IAS expertise
★ GEC 4000 Series knowledge
★ Experience with CORAL 66
★ Micro computer experience

In return we offer exciting opportunities with our professional but friendly division in its early stages of development together with excellent salaries, fringe benefits and prospects for a variety of challenging assignments.

Please send written applications to the address below, or phone one of the following for further information:

DEREK FISH 01-387 9746
CLAY BRENDISH Farnborough 513330
CERI JAMES (after 8 p.m.) Reading 413860

JOHN BELL COMPUTER SERVICES LTD.
33 WARREN STREET, LONDON W1P 5DI
TELEPHONE: 01-387 9746

MINIS GET AHEAD!

PROGRAMMER/ANALYSTS to £5,500

Outstanding career opportunities for mini oriented Programmers! You will join a fast moving team working on new PDP-11/RSX based commercial/industrial projects both externally and within the group. Be trained on equipment at the forefront of technology, and gain valuable experience in commercial applications.

If you have FORTRAN/BASIC experience on any machine based computers (dual key and essential) then this opportunity is for you! Starting salary to £5,500 plus large car, benefits. If you live in London, Surrey or Kent (but not so now) for people living outside these areas generous relocation allowances are available. Ref. 613/65.

ab executive (KINGSTON) 01-546 9473

MORE AND BETTER JOBS! FROM COMPUTECH IN REALTIME!

For ten years COMPUTECH has been finding better jobs for people in the computer field. Since April this year we have been keeping our extensive registers online in our own disc based state of the art micro computer system.

The personal touch has been maintained but our consultants now have a powerful means of rapid search at their fingertips and under their control for locating the best job for YOU!

REGISTER NOW!

168 Finchley Road, London, NW3 6HP

SYSTEMS ANALYST (Minicomputers)

LONDON W1
up to £6000

Our clients are planning to install a number of mini computers throughout their organisation in Central London, and now seek an experienced analyst to:

* *carry out feasibility studies relating to minicomputers*
* *give presentations to user management*
* *have technical responsibility for implementation*
* *occasionally give programming assistance*
* *take part in the evaluation and procurement of data transmission and terminal equipment, and assist in the consideration of microcomputer applications.*

This opening has good career prospects, in a large organisation which also uses mainframe equipment. It will interest candidates who

* *have had at least six years relevant DP experience, including the use of mini computers on non-scientific applications (ideally but not necessarily embracing knowledge of database software and/or teleprocessing)*
* *are at least 26, with a degree-level education*
* *have the ability to lead a small team*

Please ring us for a preliminary confidential discussion, quoting ref 804. Messages will be recorded after hours.

EDP Systems
Tel: 01-637 5796
52-53 Margaret Street London W1N 7FF

QUADRANT SOFTWARE'S YORKSHIRE SUCCESS . . .

Just four short months ago Quadrant Software Limited, the leading independent Northern-based software house, opened its North Eastern Regional Office in Sheffield. In that time the office has grown, as planned, to a strength of 20, and is now in profit overall — an amazing achievement. The second phase of expansion, to meet targets for the first quarter of 1978, is now beginning, creating the opportunity for seven more professional programming staff to experience the unique interests and challenges of the software house way of life.

LEAD PROGRAMMERS
£3500 to £4000 Plus expenses overtime, etc.

For appointment at this level candidates must be competent programmers, capable of tackling the largest batch program on their own. They are unlikely to have less than two years' experience, and must have worked with a minimum of two machines or languages. Most machines and languages are of interest, and some exposure to on-line techniques would be a great advantage.

SENIOR PROGRAMMERS
£4200 to £4800 plus profit share plus expenses overtime, etc.

This is the slot for the truly professional programmer, fully conversant with several machines and/or languages, almost certainly with on-line or data-base experience, and with an interest in programming standards and methodology. Senior Programmers usually work on projects with a high technical content, or else lead small teams on more straightforward applications.

SOFTWARE HOUSE
Plus Points

★ Emphasis on development, to realistic timescales.
★ The opportunity to learn other machines and languages, both mini and mainframe.
★ Variety of working environment, as work is done both in-house and on clients' premises.
★ A high degree of personal responsibility.
★ Six-monthly performance reviews, with promotion purely on merit.

All of these vacancies are based at our large, modern offices in Sheffield, but the area covered by the office means that candidates living anywhere between Bradford and Nottingham/Derby would be of interest.
To find out more, please telephone or write to Les Abbott, Regional Manager, at Bank House, Queen Street, Sheffield S1 1UF, telephone Sheffield (STD 0742) 738794. He will send you a copy of our booklet "Life with Quadrant" and will, if you seem relevant, arrange an early interview.

. . . CREATES FURTHER CAREER OPPORTUNITIES

South East Thames Regional Health Authority

We are currently setting up a remote data collection network and require a

SENIOR OPERATOR

for our installation at TUNBRIDGE WELLS

Although he/she will be based at the above site and may be required to work at any of the other installations in the region from time to time. He/she will undergo a 2 to 3 week familiarisation course at King's College Hospital Computer Installation.

SENIOR OPERATOR

— £9989 to assist in the running of a CTL MOD 1. Experience required at least 18 months' working with the above machine. Applicants should have a good general education at least to "O" level standard.

For further information and application form returnable within 14 days of this advertisement appearing write to:

The Regional Operations Project Co-Ordinator
South East Thames Regional Health Authority
Computer Installations
Kings College Hospital
Denmark Hill, London SE5 9SS
or telephone: 01-274 6222 ext. 2574

COMPUTER OPERATOR

Boosey & Hawkes leading musical instruments manufacturers and distributors require a Computer Operator for their new ICL 2904 installation. A variety of interesting applications including on-line systems are being implemented which will necessitate shift work in the future.

If you have had at least 6 months' operating experience and are seeking a new challenge, then we would like to hear from you.

A competitive salary will be offered and benefits include pension scheme and subsidised canteen.

Please write or telephone:
Mr. L. Blood, Personnel Manager
Boosey & Hawkes Musical Instruments Limited
Deansbrook Road, Edgware, Middlesex
Tel: 952 7711

BOOSEY & HAWKES

Data Terminal and VRC Sales Executives

We are looking for successful Data Terminal or VRC Sales Executives (male or female) aged between 25 and 40 and able to show an outstanding track record.

You'll fill new positions which arise from our current expansion phase and be involved with our new products. We have recently launched the powerful ITT 3830 multi-functional terminal system using floppy discs, and the ITT 3805 programmable communications controller: they join an established product range which already occupies a leading position in the marketplace.

We'll expect that you will be looking for opportunities as well as cash. ITT's first class products are backed by the professional support required to ensure their success—our sales, systems support and marketing organisations are only one aspect—after sales service is provided by an equally professional customer services organisation.

Our growth in product and in organisation means that opportunities for personal development are good. You will be able to discuss these with some of our recently promoted Regional Sales Managers. They will show you how we'll use your background in Data Terminal or VRC's in our organisation.

We are currently recruiting in North and South London and offer you the chance to match up to our top salesmen/women who are currently earning over £12,000. There's an excellent fringe benefit package, including full relocation assistance where appropriate, and we offer a choice of Company car.

If you have the positive and realistic approach to recognise an outstanding opportunity, and live south of the river telephone Trevor Jones on 01-300 7788 Ext. 3676, or north of the river telephone Ernie Woodruff on 01-440 4141 Ext. 481. Alternatively please write to Gordon Green, ITT Business Systems, Diversey House, 1A Chelk Lane, Cockfosters Road, Barnet, Herts.

ITT Business Systems ITT

Are you satisfied

that your present job, salary, location and prospects are all that you want them to be?

If you're not, come and talk to one of our consultants. They understand the problems. They know the market across the entire DP field including Sales.

Telephone 01-637 9611 or post the coupon today.

name
address
phone

MANAGEMENT & EXECUTIVE SELECTION
Suite 201/6, Albany House,
324 Regent Street, London W1R 5AA.

Project Leaders Analysts and Programmers

Ashford, Middx.

United Glass Limited manufactures a large range of glass, plastic and metal products at its factories throughout England and Scotland. To cater for the Company's needs the Group Management Services Department operates an IBM 370/138 running under OS/VS1 and a rapidly expanding network of Datapoint 2200 and 5500 mini-computers. The applications include Production Reporting, Pensions, Personnel, Payroll, Stock Recording and a large number of sales and financial systems.

The Department operates on a bureau/consultancy basis and is divided into multi-disciplined project teams servicing the central functions and operating divisions of the Company. There is considerable pressure on the Department to provide a professional solution to a wide range of business problems. It is, therefore, essential that Analysts and Programmers are technically competent and able to work within cost and time budgets. To service the Company's needs we are looking for the following people:—

Project Leaders
-Salary £5,250-£5,500

- About 7 years experience in systems and programming.
- Responsible for major systems development from feasibility study through to implementation.
- Able to communicate with all levels of management and train staff in the use of new systems.
- Able to lead a team of analysts and programmers working on more than one project at any one time.
- Be prepared to travel to the UK locations to undertake system development.

Senior Systems Analysts
-Salary: £4,750-£5,000

- About 5 years experience in systems and programming.
- Involved on major systems development from feasibility study through to implementation.
- Able to develop customer requests and produce computer specifications and train users in the use of new systems.
- Able to guide and instruct programmers during systems development.
- Be prepared to travel within UK and undertake system development.

Lead Programmer Analysts
-Salary: £5,100-£5,400

- About 5 years programming experience.
- Possess practical experience of the design and use of database systems.
- Possess experience of OS procedures.
- Thorough understanding and use of IBM COBOL.
- Experience of leading a programming team.
- Ability to act as technical adviser to the programming team.

Datapoint Programmer/Analyst
-Salary: £4,000-£5,000

The position is available at both senior or junior levels, the appropriate position being offered according to qualifications and experience.

- To develop and maintain systems on Datapoint 2200/5500's.
- The ideal candidate should have Datashare experience but any solid datapoint programming expertise would be an asset.
- The person should have the ability to work within the minimum of supervision at any of the United Glass locations in England and Scotland and be able to deal with all levels of management.

Our pleasant air-conditioned offices are located in Ashford which is situated on the main Southern Region line to Waterloo. The Company offers 4 weeks holiday, LV's, pension scheme, free life assurance, flexible working hours and free BUPA membership is given with the senior posts. Relocation expenses will be given where appropriate.
Please write or telephone for an application form to:
Miss Claire Symons, Personnel Officer, United Glass Limited, Kingston Road, Staines, Middx. Tel. Staines 51321

Or if you want to call after office hours: phone Bryan Wakefield on Ripley 2689 or Mike Gray on Bracknell 25248

UG

PROGRAMMERS

in RPG II and/or Assembler for

ABERDEEN COMPUTER BUREAU

Phone or write

CLAYMORE MANAGEMENT
72 Carden Place, Aberdeen (0224) 28399

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

CONSULTANTS

CITY **c £8,000**

A small, well established Consultancy, having achieved a 100% annual growth since formation in 1974 is seeking two additional Consultants.

They will be interested in business matters; keen to develop management skills in a position offering job satisfaction, high rewards and the opportunity of developing personality and expertise in the Computer Industry. Dealing with people, developing relationships, and understanding Client requirements will be a major aspect of the work, involving communications and computing skills.

They will be well educated with computer experience gained in a commercial environment. An awareness of business gained in a Contract Programming or Consultancy role would be particularly relevant although a desire to grow with the Company is of prime importance.

These positions offer a first year salary in the region of £8,000 although a substantially higher figure will be achievable following on job training during the first year. The Company offers a professional and mature approach to consultancy resulting in a high competitive spirit and united commitment to growth.

Please telephone for a confidential discussion or write to:
30 Fleet Street London EC4Y 1AA
01-353 5868

Analyst / Programmer

£3,500-£4,500

Based in a rural setting at St. Neots in Cambridgeshire, Samuel Jones and Company form a significant part of the Wiggins Teape Group, manufacturing adhesive tapes and papers.

A vacancy exists for an Analyst/Programmer to work in a small team developing an order processing and stock control system for implementation during 1978. Other major projects to follow will include a production control system.

The equipment, to be installed shortly, will be an IBM 3790 using VDUs on line to the host 370/148 which is remotely located at the Group's headquarters in Basingstoke.

This position would suit programmers of 3 years' programming experience ideally with some time spent in the 3790 area, who are looking for a next career step into a more responsible and demanding job.

The terms and conditions of employment are first class including relocation expenses as appropriate, with very good opportunities for further progression within the Wiggins Teape Group.

Please write or telephone for an application form to:
Gareth Trevor, Personnel Officer
SAMUEL JONES & COMPANY LIMITED
Butterfly House, St. Neots, Cambs. PE19 4EE
Telephone: Huntingdon 75351

Wiggins Teape Limited

DUBLIN

ASSISTANT DIRECTOR and SENIOR SYSTEMS ANALYST

An ASSISTANT DIRECTOR is required by the Local Government Computer Services Board in Dublin to assist the Director in providing a service for local authorities by being involved in both the long term decision making and the day-to-day running of the Board's affairs.

The Board is implementing computer systems in Local Authorities throughout the Republic of Ireland.

Candidates must have a high standard of education and should have a minimum of five years' experience in data processing including at least two years' experience of leading project teams. A good knowledge of systems techniques and an understanding of programming concepts will be expected.

Age: 25-45 years.

Salary scale: £7121 x £160 — £8021. A starting salary above the minimum may be allowed in certain exceptional circumstances.

The Board also requires a SENIOR SYSTEMS ANALYST to plan and control computer projects.

Candidates must have attained a good standard in general education and have had least four years' experience in the design and implementation of computer systems.

Age: 25-45 years.

Salary scale: £8407 x £170 — £8747 x £171 — £8918 x £187 — £7085 x £166 — £7251 x £170 — £7421.

A starting salary above the minimum may be allowed in certain exceptional circumstances.

Telephone enquiries to: Trevor Linger, Director of Computing; Tel: Dublin 308874 and application forms from: M. Lynch; L.G.C.S.B., Floor 2, Park House, North Circular Road, Dublin 7.

Application forms must be returned by 16th December, 1977.

Computing Science

The Laboratory's needs are served by one of the largest scientific computing installations in Europe. The central computer complex is based on an IBM 370/168 with multi-access facilities for a large number of terminals and computers through a front-end network. This complex is supported by scientific groups responsible for systems operation and development. Our other interests in computing science concern networks, reliable real-time systems, information science and operations research, as well as research in applied mathematics and numerical analysis.

At the moment we are particularly anxious to find suitable candidates to:

develop the general area of computer performance measurement, studying program efficiency, bench marking and performance modelling. Experience with large IBM computers using MVS and practical experience of system tuning and software monitors is highly desirable.

join a team designing and developing user access through the front-end network to the many diverse services provided by the central computer complex. The work includes the development of interactive problem solving and transaction processing services as well as interfacing to standard IBM facilities e.g. APL, TSO.

carry out networks research studies where we are interested in multi-computer, distributed processing and highly reliable real-time systems. For this work Harwell has connections to EIN and EPSS networks and has an in-house multi-computer research network.

If you have postgraduate experience in one or more of these fields you will find our work exciting and exacting. If your experience is in one of our other research areas we should still like to hear from you for our future planning.

Appointments will be either to three year Research Fellowships or to our permanent staff, with a stipend or salary in the range £3,500-£5,500 p.a. depending upon experience and ability.

Further enquiries and requests for application forms should be sent to:
Personnel Department 'A', Building 329,
AERE Harwell, Oxfordshire, OX11 0RA.

HARWELL

NORTH YORKSHIRE COUNTY COUNCIL
Highways and Transportation Department

TECHNICIAN

(T2-T4)

£2,529-£3,702 plus annual salary supplement of £484.05-£512.70

Required to form part of a team working on interesting applications in the field of highway engineering and associated fields and maintaining and supporting software used by the Department.

Applicants should have good experience in programming, especially FORTRAN, systems analysis and ICL 1900 series computers under G III, and hold a recognised qualification in computing (Deg., HND or equivalent). Experience of computing in a highway engineering environment would be desirable but is not essential.

The County currently runs an ICL 1904S (192K) computer due to be replaced in mid-1978, by an ICL 2970. Access to the County's computer is via video terminals.

Application forms can be obtained from the County Engineer and Surveyor, County Hall, Northallerton, North Yorkshire, DL7 8AH, to whom they should be returned by 12th December, 1977.

ata Computer Recruitment

A division of ATA Selection and Management Services, recruitment consultants to Industry and Commerce since 1962.

WANTED NATIONWIDE

SMALL BUSINESS COMPUTER SALESMEN WHO THINK BIG

To sell a proven range of compatible equipment from data capture devices and terminals up to fully integrated management systems machines.

BIG MONEY Basic to £5000 1st year potential 14K + car allowance or car.

BIG RANGE From office invoicing through data capture with floppy disk sub systems to small systems designed for the first time user or to interface with large central systems. At the top end there is a 32K byte memory machine with 2 disk units, and the following options floppy disk or card input/output auxiliary keyboard/display/printer stations and magnetic tape unit.

BIG TECHNOLOGY AND SUPPORT A manufacturer with International research and design facilities ensuring 'state of the art' technology with continual new product launches. Continuous mailshots, exhibitions and advertising software and programming support through local branch network second to none. Field engineering installation, commissioning and service to the highest standard.

BIG EXPANSION 1977 saw 100% growth in machine sales and 1978 is budgeted even higher. Genuine sales force expansion with every opportunity for promotion to Branch Management are offered to successful candidates.

To find out more telephone: **Geoff Fox in London 01-637 0781; Brian Hodges in Crawley 0293 514071; Richard Swain in Bristol 0272 211035; Ian Baker in Manchester 061-832 5857.**

LONDON (01) 637 0781 230 Gt. Portland St., W1N 5HA
MANCHESTER (061) 832 5857 86 Cross St., M2 1LA
BIRMINGHAM (021) 643 1994 Woolworth Building, 10 New St., B2 4HQ
BRISTOL (0272) 211035 Equity and Law Building, 9-13 Baldwin St., BS1 1NR
EDINBURGH (031) 226 5381 Anglia House, 24-26 Frederick St., EH2 2NR
CRAWLEY (0293) 514071 9 The Broadway

datascene

A JOB
JUNIOR OPS

IBM	DOS	City	6 mths	£2200
IBM	DOS	West End	9 mths	£3000
ICL	4H	City	9 mths	£3100
	ICL/Any	City	6 mths	£2900
DEC PDP	Any	G London days	6 mths	£3000
Univac	OS4	W London	9 mths	£3200
Honeywell	Any	G London	9 mths	£3200
Peripheral Op	Any M/C	City eves only 5-11	6 mths	£3000
DATA CONTROL CLERK		C London	6 mths	£2800

PLUS MANY, MANY MORE!

FOR FURTHER DETAILS CONTACT US NOW.
Datascene Limited **01-439 7871**
Sceptre House 24-hour answering service
169-173 Regent Street, London W1R 7FB

datascene

THAT'S GREAT
OPERATORS - YOU COULD BE WORTH A LOT MORE THAN YOUR COMPANY THINKS!

If you've reached the stage where it seems that you're banging your head against a brick wall, its time to do something about it. Like ringing us!
We have clients in all kinds of businesses, running all kinds of hardware like IBM, ICL HONEYWELL, UNIVAC NCR BURROUGHS and PDP.
They're crying out for Operators with anything from 6 months experience upwards And they're offering salaries from £3 200 to £5 000.
So, if you think you're worth more than your company does, give us a ring. Now - Because together we can make '78 great!
Ring Mike Oakes or Mark Harmer TODAY!

FOR FURTHER DETAILS CONTACT US NOW.
Datascene Limited **01-439 7871**
Sceptre House 24-hour answering service
169-173 Regent Street, London W1R 7FB

datascene

IN '78
SENIOR OPS

IBM	DOS	West End	Snr OP	18 mths	£4500
IBM	DOS	Middlesex	OP	1 yr	£4000
ICL	4H +	West End	Snr OP	18 mths	£4300
ICL	4H	City	OP	1 yr	£3800
NCR	B2/B3	OPS MANAGER		up to	£7000
Burroughs	MCP	Surrey	Snr OP	2 yrs	£4500
Honeywell	Mod 1	Surrey	Snr OP	1 yr	£4000
Univac	Any	W London	Snr OP	2 yrs	£4400
Data Control	Clerk	City		2 yrs	£4000

PLUS MANY, MANY MORE!

FOR FURTHER DETAILS CONTACT US NOW.
Datascene Limited **01-439 7871**
Sceptre House 24-hour answering service
169-173 Regent Street, London W1R 7FB

datascene

FORTRAN PROGRAMMERS:
JINGLE OUR BELLS THIS CHRISTMAS!

But why wait until Christmas? You can jingle our bells by giving us a ring right now — and hear about some of the exceptional opportunities we can offer.
We're particularly interested in you if you have a background in Finance, Operations Research, Engineering or Petrochemicals.
These jobs are available all over London and the Home Counties, with clients ranging from cars to Software Houses.
Salaries range from sizeable stocking fillers of £3,750 to thumping great prime-cuts worthy of £7,000.
Remember. The sooner you ring, the sooner you can start.
Ring Sally Today!

FOR FURTHER DETAILS CONTACT US NOW.
Datascene Limited **01-439 7871**
Sceptre House 24-hour answering service
169-173 Regent Street, London W1R 7FB

datascene

ANALYST/PROGRAMMER to £6750
CASH IN ON THE OIL BOOM

1978 is the year when Britain's oil comes into its own. And it could be the year when you come into your own working with this international Oil Co.
Based in London, they operate IBM 360/65 and 370/168 systems under OS/MFT and MASP.
They're looking for graduates with a commercial background allied to two years' experience of COBOL. PL1 would be useful, but training can be given if needed.
In addition to the excellent salary, they also offer a comprehensive benefits package.
So, if you want to spend 1978 in what can only be called a private environment, contact us now.
Ring Phil Gascoigne TODAY!

FOR FURTHER DETAILS CONTACT US NOW.
Datascene Limited **01-439 7871**
Sceptre House 24-hour answering service
169-173 Regent Street, London W1R 7FB

datascene

SOFTWARE PROGRAMMERS:
£5000 - £7000
Twickenham

OWN YOUR OWN BUSINESS IN 1978!

No sticks. If you have about 2-3 years' experience on PDP 11s using ASSEMBLER this software house offers you the chance to be a co-owner. A background in insurance would be helpful.
BUT WE'RE STILL LOOKING FOR RED-HOT MINI-PROGRAMMERS, TOO.
Jobs also available in all areas carrying salaries from £3800 to £7800. They're mainly in Software houses involved in turnkeys from banking to Retailing.
Ring Sally Today!

FOR FURTHER DETAILS CONTACT US NOW.
Datascene Limited **01-439 7871**
Sceptre House 24-hour answering service
169-173 Regent Street, London W1R 7FB

Reed Executive

The Specialists in Executive and Management Selection

P C B Layout

Yorkshire

c. £6,500 + car

As one of the fastest growing and most technically and commercially successful mini-computer companies in Europe, our client is strengthening its own in-house services to the development and production departments. They seek a P C B Layout Specialist who will make them fully independent of outside resrouces for this facility. Suitable candidates must have a minimum of three years' experience of advanced P C B layout and prove themselves to be meticulous and tenacious whilst working to demanding time schedules. Salary and benefits will be negotiated to attract the calibre of person sought. There are excellent career prospects and a stimulating working environment.

Telephone 0532-459181 (24-hour service) quoting ref. 3340/CW, Reed Executive Selection Limited, 24-26 Lands Lane, Leeds LS1 6LB.

The above vacancy is open to both male and female candidates

London Birmingham Manchester Leeds

LINSCOTT

Computer Systems Limited

BELGIUM

2 Year Contracts for System Engineers. Early starts.

C.V.s to P.O. Box 74, Brentwood, Essex CM15 0BZ. Or telephone Stephen Trigg on 0277 212021.

PROGRAMMERS £3,800-£7,500

COBOL - RPG - PL/1 - ASSEMBLER - FORTRAN

Alperton — Brentford — Brighton — Croydon — City — Caterham — Crawley — Camberley — Ealing — Feltham — Guildford — Hayes — High Wycombe — Horsham — Kingston — London (SE) — Maidenhead — Reigate — Redhill — Ruislip — Richmond — Slough — Sutton — South Norwood — Sunbury — Uxbridge — West End — Wimbledon — Walton-on-Thames — Weybridge — Wembley.

If you are seeking a position in any of the above locations, please phone for an application form.

AMES PERSONNEL

TELEPHONE: 01-767 0611

Shift Manager

C £6,000

Overseas Containers Limited is one of the world's largest container transport operators, with services from the UK and European ports to Australia and the Far East. Recent massive investment has opened new trade routes to South Africa, New Zealand and the Pacific Basin.

Behind this positive investment is the need for sophisticated computer systems to deal with the complexities of world-wide container movements and their related financial and administrative controls. Our EDP Department is therefore being expanded to meet this need. Currently operating an IBM 370/158 running under VM/370, DOS/VS and CICS/VS used in a large TP network, the Department is moving towards two 370/158's with MVS, CICS/VS, and developing a Database.

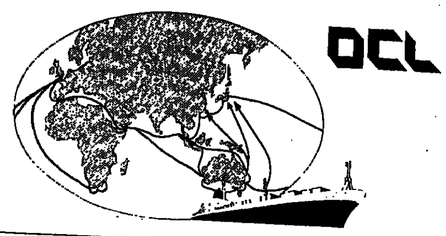
It is against this background that we now need to recruit an experienced Shift Manager.

The man or woman appointed will be responsible for controlling a shift of approximately 12 operators and data control staff. This is a particularly demanding and challenging position calling for a real self-starter able to motivate through technical competance and personal example.

Aged over 25, you must have a minimum of 5 years operating experience (at least 2 at supervisory level), a knowledge of DOS and/or OS, have worked on a medium/large IBM installation which preferably included a teleprocessing network and possess good communication skills.

In addition to genuine career prospects in an expanding environment, conditions at our City based installation are first-class. They include season ticket loans, pension and life assurance schemes and a subsidised staff restaurant.

For further information and an application form, contact Janet Spalton, Overseas Containers Limited, Beagle House, Braham Street, London E1 8EP. Tel: 01-488 1313.



Computer Programmer

An experienced programmer is required by a modern clinical laboratory in West Germany.

Candidates should have several years experience of commercial data processing with special knowledge of the following systems :–

DOS
Assembler
CICS
PL1 (Knowledge of this system would be of advantage)

Knowledge of German is not essential. However, applicants should be willing to stay in Germany for several years, and relocation expenses to West Germany will be reimbursed by the Company.

A generous salary which will be negotiable according to experience will be paid to the successful applicant.

Arrangements will be made for interviews in London.

Please send a letter of application, together with detailed curriculum vitae and names and addresses of two referees, to :–

Personnel Department,
Boehringer Ingelheim Limited,
Southern Industrial Estate,
Bracknell, Berkshire.
Tel. No. Bracknell 24600

4864

SYSTEMS ANALYST

The Vehicle Instrumentation Division of Smiths Industries has recently obtained contracts to supply instrumentation for new cars to Renault, Fiat and Volvo. A vacancy has arisen which would enable you to combine computer systems development with management responsibilities in a manufacturing operation.

The Systems Analyst will liaise with the Corporate Computer Department on design, development and day to day operating of the factory computer scheme. It is envisaged that you will also be given management responsibility for sections of the Production Control Department.

The post is an excellent career opportunity for a young professional with at least two years' experience in factory computer systems, who wants to broaden his/her experience in a management role.

The post carries the benefits normally associated with a large national Company and consideration will be given to relocation expenses.

Please write or telephone for an application form to

John Manson, Employment Officer

SMITHS INDUSTRIES LIMITED

VEHICLE INSTRUMENTATION DIVISION

MA1 Factory, Cricklewood Works
London NW2 6NN
Tel. 01-452 3333 ext. 2651

THE UNIVERSITY OF MANCHESTER EXPERIMENTAL OFFICER

PHYSICIST–PROGRAMMER

A vacancy exists within the Nuclear Physics Group of the Physics Department for an Experimental Officer. Duties will include sharing responsibility for the operation and programming of three DEC 18 bit computers. The successful candidate will be expected to collaborate with Nuclear Structure research workers in making effective use of computers for the acquisition and analysis of data. Candidates must have experience of the experimental techniques of nuclear research. A knowledge of at least one high level programming language and ability to programme at the assembly level are essential. The appointment will be in the grade of Experimental Officer 1A (Salary range £3,333 - £5,627 per annum). Application forms are obtainable from the Registrar, The University, Manchester M13 9PL. (Returnable by December 20th).

Systems Engineers
Computer Salesmen
Project Leaders
DP Managers
Systems Managers

Up to £10K

Consultancy

Line Management

This advertisement is addressed to Systems Engineers, Computer Salesman, Project Leaders, Systems and DP Managers because most of our senior people left positions such as these to join us. We are still expanding rapidly and wish to recruit staff aged between 25 and 35 to become consultants. We offer you training and the opportunity to exploit your managerial and technical skills. We expect to develop your ability to the full so that you are well rewarded both in terms of salary and responsibility.

As a consultant you will be required to undertake a variety of different assignments. You will certainly need to manage projects and you will learn the unique Hoskyns structured approach to the management and control of computer projects. As a manager you will have full responsibility for keeping projects to schedule, within budget, and above all for producing consistently high quality work for our clients. Where necessary you will be trained in new techniques and developments.

Once you have proved your ability as a consultant, there are several different directions in which you could move. For example, you could become a Senior Consultant, responsible for major projects, a Projects Manager, responsible for a number of consultancy and systems development projects, or you could take advantage of opportunities in other divisions of the Hoskyns Group, both in the U.K. and overseas. Hoskyns is part of an international group with sales in excess of £900 million.

If you would like to know more about the opportunities at Hoskyns, please send us a curriculum vitae or write or phone for an application form to

Nigel Bacon, Director,
John Hoskyns & Company Limited,
81-83 Farringdon Road, London EC1M 3LB
Telephone: 01-242 1951

hoskyns

A Systems Company with over [illegible] Computer Centres and [illegible] Computer Systems Engineers

---

LOWFIELD (STORAGE & DISTRIBUTION) LTD.

REAL-TIME PROGRAMMER

Up to £3,750 p.a.
Daventry, Northants

Lowfield, a subsidiary of Imperial Foods, provides a nationwide food delivery service based on major warehousing and distribution depots throughout the U.K.

At our Daventry Headquarters we have a small professional team developing advanced real-time commercial data base systems using a distributed network of Data General Nova Computers.

We are now seeking to strengthen this team with a man, or woman, preferably with two years' low level programming experience on minis.

Please write giving details of age, qualifications, experience and present salary to: Personnel Director, Lowfield (Storage and Distribution) Limited, 4-8 Church Walk, Daventry, Northamptonshire.

Urgent Requirements

1. Manager Mini Time sharing, Northants, £5.k+.
2. Commercial systems graduate with experience, Ipswich, £5.k+
3. Programmer all levels to £4.5k

ICL, COBOL, IBM, Assembler or PL1 Mini Assembler or Cobol or Fortran.

Ring Brian Richmond 0603-867233 (or leave a message on our Ansafone), or write to join our register for all computer jobs in East Anglia.

EAST ANGLIAN SYSTEMS LIMITED
P.O. Box 70
Norwich NR1 4EF

Manchester/ Merseyside

Sales Executive Computer Systems

Quota Earnings Circa £11,000
Basic Circa £5,500
Plus Initial Guarantee
Plus Company Car

Our Clients are one of the World's largest and most respected manufacturers of computer systems with a product range encompassing stand-alone processors to full distributed intelligence. Despite their overall aggressiveness, the Company balance sheet management is conservative and their controls are excellent.

Continued expansion in the U.K. has created this additional requirement for an experienced sales executive. Candidates will have a successful track record in selling computer systems against quota, be self-motivating and able to work autonomously. They will also possess the ability to sell the range of fully compatible systems in a variety of operating environments including:

* Commercial Data Processing
* Communications
* Education
* Distributed Processing

Candidates who feel they meet this specification are invited to telephone the Advising Consultant to arrange a meeting in either London or Manchester when full details of our Clients will be given.

Reference CW/511/1

HUTTON EXECUTIVE SELECTION LTD.
HUTTON HOUSE,
HUTTON STREET, LONDON EC4Y 8HP.

01-353 6187 (Office Hours)
01-353 1436 (Ansafone Service)

Hutton

SPECIALIST RECRUITMENT CONSULTANTS

Hertfordshire

Mini Computer Manufacturer

Established now for well over a decade our Clients enjoy an excellent reputation in this highly competitive marketplace wherein lies the future of the computer industry. Two key positions are currently open:

Systems Support Manager
To £8,000 plus Car Allowance

The overall purpose is to manage the Systems Support Department. Candidates should have at least seven years in software, the last three of which should have been as a manager of a department. Desirable is experience in commercial software, software house involvement and hardware knowledge and essential is the ability to communicate to both senior management and customers. The successful candidate will be advising both on software maintenance policy and the decentralisation of software support within the Company.

Senior Programmer
Circa £6,000

Candidates should preferably be graduates with 4-5 years' experience in either filing system design/implementation or Language Compilers. The work involves the development of more intelligent information systems and as well as the ability to communicate well, candidates should show project leadership potential.

Please telephone the Advising Consultant to arrange for a detailed discussion on either position.

Reference CW/511/2

HUTTON EXECUTIVE SELECTION LTD.
HUTTON HOUSE,
HUTTON STREET, LONDON EC4Y 8HP.

01-353 6187 (Office Hours)
01-353 1436 (Ansafone Service)

Hutton

SPECIALIST RECRUITMENT CONSULTANTS

Control Manager
c. £6,000 Taunton.

The Administration and Computer Centre provides comprehensive management services to the Debenham Group. We need to recruit a Control Manager based in Taunton, Somerset, to be responsible for 90 staff engaged in preparing and controlling the data input to and output from the Group's Computer systems.

This is a new management position which will suit the innovator with organisational ability. The man or woman appointed will be responsible for developing the controls which are used, and for ensuring that they are properly applied.

As a key member of the Computer Services management team your job will be challenging and exciting.

An application form and job description, together with details of the excellent company benefits, may be obtained from:

Mrs. Elizabeth Kennedy,
Personnel Executive,
Debenhams Limited,
1 Welbeck Street, London W1A 1DF.
Tel: 580-4444 Ext. 544 or 730.

Debenhams

SENIOR PROGRAMMER

The Company: Ibex Computer Services — an independent service bureau.
Location: Modern offices situated close to tube and BR stations in North London.
The Job: Senior programmer responsible for the complete development of defined systems covering a wide range of applications for our clients.
The Machine: NCR Century 75, card, PPT and cassette input, 7200 terminals.
Experience: A sound experience in NEAT/3 and Century operating systems is essential.
Opportunities: Progression to systems design.
Salary: Negotiable
How to apply: Write for an application form giving brief details to:

Systems Development Manager
IBEX COMPUTER SERVICES LTD.
Euro House, 1394 High Road, Whetstone, London N20 9LS

LEADING LLOYDS UNDERWRITER REQUIRES THE FOLLOWING PERSONNEL TO WORK AT THEIR LONDON, EC3, 1902T COMPUTER CENTRE

1. PROGRAMMER

With 2 years' Cobol Programming on an ICL disc/tape system, George II experience preferred.

2. OPERATORS

With 18 to 24 months ICL 1900 experience using Manual & George II, must be prepared to work Monday-Friday 3-shift system.

3. DATA CONTROL CLERK

With one year's experience, using card input.

The Company offers good salaries, bonuses, pension & mortgage schemes, LVs and other benefits.

For further details, Phone 01-709 9840
Mr. P. J. Harper (1 & 3)
Mr. M. G. Riddell (2)

We would like to remind **ADVERTISERS** that copy for the issue of **JANUARY 5th,** 1978, should arrive at our offices no later than 4.30 p.m. on FRIDAY, DECEMBER 30th, 1977.

Sales Executives

Potential Earnings £18,000 + & Car

North West England,
South West England &
Home Counties (East)

Specialists in distributive computer systems, the DATA 100 Corporation is established amongst the 'Top 25' American computer manufacturers.

Since its formation in 1970 the Company's outstanding success has been based on equipment reliability, unrivalled customer support and dedicated sales effort.

The continuing expansion of the U.K. company and the growing demand for our products have created exceptional opportunities for additional sales executives.

Applicants must boast a successful track record in selling to the general data processing environment and a sound applications/systems knowledge.

If you wish to become part of DATA 100's exciting future and join a highly successful sales force with average earnings well into five figures, waste no time in contacting:

Helen Mitchell,
DATA 100 Systems Ltd.,
Arden Grove, Harpenden,
Herts. AL5 4UD.
Tel: Harpenden 63161.

DATA 100

Manchester
Computer Project Staff

Project Managers

We are seeking two project managers, one to handle industrial process control projects, the other to handle projects involving data communication networks.
Our project managers take responsibility for all aspects of a project. Internally they are responsible for co-ordinating resources, managing the engineering and software teams assigned to the project and meeting the performance specification within the planned budget and time scale. Externally they provide the main link between the customer and the Company. These are senior appointments. Applicants should have a good scientific or engineering background and substantial experience of real-time computer applications in a relevant field, with either a supplier or a large user.

System Designers/Programmers Project Engineers

We have vacancies at senior and intermediate levels for a number of system designers, programmers and project engineers to join project teams, handling real-time computer applications.
These are attractive openings for competent professionals who are looking for technical challenge and advancement. Candidates should have at least two years' experience in the real-time field and successful applicants are likely to have a degree in computer science, mathematics, physics or engineering.
Successful staff in these categories can expect to progress quickly into senior system design or project management positions.

Technical Authors (equipment and software)

Good technical documentation—design specifications, operating manuals, programming manuals, maintenance manuals—is essential to the success of any advanced computer project. Our technical authors gather information first hand as full members of the integrated engineering and software project teams and are responsible to the Project Manager for writing all the technical literature with a minimum of supervision.
Self motivation, a logical mind and the ability to write clear concise English are more important than formal qualifications although most of our best authors do have a good academic background. Naturally, experience in computer software or engineering would be an advantage but we are prepared to provide training for candidates from other disciplines who are otherwise suitable.
FERRANTI LIMITED is a wholly British Company. We design and manufacture the ARGUS 700 range of computers and are European market leaders in supplying real-time industrial process control and on-line data communication systems.
Being system suppliers as well as equipment manufacturers our staff are able to see projects as a whole and the interactions between hardware and software design are within their direct control. Professional development is encouraged.
Competitive salaries will be offered. Generous relocation allowances are available where appropriate. Our offices and laboratories are in a pleasant part of South Manchester, close to very good residential areas.
Apply in the first instance to Mr. W. L. Robinson, Ferranti Limited, Simonsway, Wythenshawe, Manchester M22 5LA giving brief career details (quote reference WD15/ CW).

Informal Interviews

If you would like an informal discussion on career prospects with Ferranti in any branch of computer system design, software, project engineering, sales or customer support, senior members of our staff will be happy to meet you at one of the following times and places:

LONDON:	Charing Cross Hotel,	Monday 5th December	4.30 pm to 8 pm.
WATFORD:	Beehive Hotel,	Tuesday 6th December	4.30 pm to 8 pm.

Please telephone 061-437 5391 ext. 236 (reverse charges) to make an appointment.

FERRANTI
Wythenshawe Division

SHIFT LEADER — c. £6000+ — **N.W. LONDON**

Our client is looking for a person with 3 to 4 years' operations experience of OS/MVT and HASP, and some DOS preferably. A 3-shift system is operated on an IBM 360/50. Excellent promotion prospects are offered and company fringe benefits in line with those associated with a major international organisation. Ref 232

SHIFT LEADER — £4750 — **CITY**

A major insurance group requires an individual with 3 years' or more experience of IBM operations, together with an excellent knowledge of DOS/VS POWER and CICS to lead a shift on their 370/145 which is operating on a 2-shift basis. Ref 213

PHONE 353-8201
X-Calibur Computer Services
47 Essex St., London WC2

X·Calibur
COMPUTER SERVICES

PROGRAMMERS/ANALYSTS
Team building with the 2900 for your future and ours. In Leeds

By 1982 with NEGAS you could have developed with us and worked on the computer of the future—the 2900 Series. Do your present prospects match that?
Our current installation is an ICL 1904S, 256K, 24 x EDS 60, 12 x 2509 given before that you'd be working on the latest hardware with NEGAS. MT, 3 x 2430 Tape Printers, 2 x CR, VDUs and Fermi-printers, about. operating under George III. NEGAS has a lot to make you think And so too has Leeds. In the motorway city you'll find low cost housing, good shops, every modern facility for leisure and it's only half an hour from the moors and dales of Yorkshire.
To obtain more details and an application form write to the Recruitment Officer, NEGAS, New York Road, Leeds LS2 7PE.

Enhance your career in the best environment

NEGAS

IIRS IRELAND

IIRS is the national agency for industrial research and technology in Ireland.

ANALYST/PROGRAMMER

is required in its computer section. The section provides a technical computing service for the technologists within the Institute and for Irish industry in general.
The installation comprises a 128KB, DEC PDP 11/34 operating under the RSX-11M operating system linked to a large IBM mainframe (370/158).
Candidates should be educated to degree standard (or equivalent) with a minimum of four years' programming experience. All applicants must be competent FORTRAN programmers and experience of RSX-11M and MACRO would be an asset. A knowledge of IBM JCL would also be advantageous.
Appointment will be at Scientific Officer level. Entry point will depend upon qualifications and experience.
SALARY RANGE: £3,947 - £5,765 per annum.
In special circumstances, appointment may be made at the Senior Scientific Officer level. (Salary Range: £5,981 - £7,626 per annum.)
Application forms available from:
THE PERSONNEL MANAGER,
INSTITUTE FOR INDUSTRIAL RESEARCH AND STANDARDS,
BALLYMUN ROAD, DUBLIN 9, IRELAND.

NOTTINGHAM

Do you know what is happening in Nottinghamshire? Find out by calling in at The Albany Hotel, St. James's Street, Nottingham on the 8th and 7th of December, between 12 noon and 8.30 p.m. No appointment necessary.

WEST YORKSHIRE

PROGRAMMER to £4K. Major company requires first class programmers with sound knowledge of at least one low level language. Experience of minis also useful.
ANALYSTS to £4.6K. First class career opportunity for project orientated programmers wanting to break into analysis work. Career potential is extremely high for ambitious person.
ANALYST/PROGRAMMER £4K. IBM experience for development work in major national organisation. Programmer will be trained as analyst and can anticipate a bright future in manufacturing industry.
ANALYST/PROGRAMMER £4.5K. Cobol programmer will be trained as analyst in a long established West Yorkshire engineering company. Genuine career path is offered to sound individual with ambitions.
MANUFACTURING SYSTEMS SPECIALISTS – name your salary — required by rapidly expanding company. Vacancies exist in Yorkshire, Lancashire and Scotland. Experience in engineering environment must be of the highest order.
ANALYST to £5.2K. If you have programmed in COBOL and like analysis work, freedom to work on your own and can advise management on development proposals then a high salary and good career prospects are available.

CROYDEN AND BRENTFORD

ANALYST/PROGRAMMERS and SYSTEMS MANAGERS required by forward looking expanding organisation. Low level languages and experience of mins very useful. Salaries will range from £4K to £8K. Right type will be creative, self motivated people.

Interviews will be held locally for these appointments.

QUEENS ROAD MILLS — HALIFAX 58231

Q&H
COMPUTER RECRUITMENT

NATIONAL COMPANY

Systems Analyst
up to £4,400 p.a.

Based at HARROGATE or HEANOR to assist in the implementation of systems on our ICL 2903/4 disc/magtape) computers.

Applicants should be able to show proven systems ability preferably on ICL equipment. They should also be prepared to travel to companies serviced by the two sites.

Applications in writing giving details of preference of location, age, experience, qualifications, present position and salary should be forwarded to: Mr. D. G. F. Rowlinson, Regional Director, Northern Region, National Bus Company, 66 Conniscliffe Road, Darlington DL3 7EH, not later than December 12th.

Come along for an informal chat about bringing your computer skills to a major new installation.

Anglian Water Authority

Our client, a public body, is located in a most attractive part of East Anglia within easy reach of London and the Midlands. At the moment, it is in the process of installing one of the largest and most significant DP operations in the country, utilising two Honeywell 66/10 computers with extensive use of data base and telecommunications techniques including 100+ remote terminals.

Our client requires:

PROJECT LEADER TO £6,830
Experienced chief programmer of graduate calibre with minimum five years' experience COBOL, FORTRAN and ASSEMBLER language. NJC Grade 9. Ref. No. 106/JP/CW.

SYSTEMS ANALYST TO £5,537
Strong computing background and experience of financial systems in a large installation including on-line applications and data base concepts and experience of design and analysis. NJC Grade 7. Ref. No. 107/JP/CW.

SENIOR SOFTWARE DESIGNER TO £5,537
Graduate with 3+ years programming experience including use of COBOL and knowledge of tele-processing including VDU's etc. NJC Grade 7. Ref. No. 108/JP/CW.

PROGRAMMING TEAM LEADER TO £5,000
University degree/relevant business qualifications, 3+ years programming experience with COBOL, teleprocessing and knowledge of data base with experience of leading a team. NJC Grade 6. Ref. No. 109/JP/CW.

SENIOR PROGRAMMER TO £4,517
3+ years experience with COBOL and interactive programme development, modular/structured programming techniques. NJC Grade 5. Ref. No. 110/JP/CW.

PROGRAMMERS TO £4,073
2+ years programming experience using COBOL and modular programming/testing techniques. NJC Grade 4. Ref. No. 111/JP/CW.

JUNIOR PROGRAMMERS/TRAINEES TO £3,210
Minimum one years' experience including COBOL **or** an ideal opportunity for an HND–"A" level calibre man or woman to build a career in the computer sciences. NJC Grade 2. Ref. No. 112/JP/CW.

These are career positions which will appeal to computer professionals anxious to develop their skills in a progressive environment. Our client offers truly generous relocation and re-settlement benefits in a low cost housing area.

If any of these opportunities are of interest, you are invited to come for an informal talk to consultants advising the Anglian Water Board on these appointments, to the following locations.

LONDON
Moxon Dolphin & Kerby Ltd., 60 St. Martin's Lane, London WC2. Wednesday, 7th December 1977 3:00pm to 8:00pm

NEWCASTLE
Swallow Hotel, Newgate Street, Newcastle Upon Tyne. Saturday, 10th December 1977 10:00am to 3:00pm

LIVERPOOL
Holiday Inn, Paradise Street, Liverpool. Monday, 12th December 1977 3:00pm to 8:00pm

MANCHESTER
Post House Hotel, Palatine Rd., Northenden, Manchester 22. Tuesday, 13th December 1977 3:00pm to 8:00pm

LEEDS
The Dragonara Hotel, Neville Street, Leeds. Friday, 9th December 1977 3:00pm to 8:00pm

HULL
Centre Hotel, Paragon Street, Hull. Saturday, 10th December 1977 10:00am to 3:00pm

BIRMINGHAM
Holiday Inn, ATV Centre, Holliday Street, Birmingham. Monday, 12th December 1977 3:00pm to 8:00pm

If these dates are inconvenient, write or better still telephone for an application form to Jeffrey Parmenter, quoting the appropriate reference number, at Moxon Dolphin & Kerby Limited, 60 St. Martin's Lane, London WC2N 4JB. Telephone 01-836 1500.

MOXON DOLPHIN & KERBY LTD
MANAGEMENT SELECTION

---

ata Computer Recruitment

A division of ATA Selection and Management Services, recruitment consultants to Industry and Commerce since 1962.

PROJECT MANAGERS AND SALES SUPPORT STAFF
to £7,000 p.a.

OUR CLIENTS, A MAJOR MANUFACTURER, ARE UNDERGOING A CONTROLLED EXPANSION PROGRAMME WITH ONE OF THEIR HOME COUNTIES BASED SALES OPERATIONS AND HAVE OPPORTUNITIES FOR SUPPORT STAFF LIVING WITHIN REASONABLE COMMUTING DISTANCE OF THEIR LONDON OFFICE. THESE POSITIONS OFFER THE CHALLENGE THAT GIVES JOB SATISFACTION TO THOSE SUITABLY MOTIVATED.

PROJECT MANAGER — **to £7,000 p.a.**
You will be totally responsible for managing all aspects of installing large computer projects. You will already be an experienced project manager and will be aware of the problems and daily challenges offered by this position.
A knowledge of 1900 or large 2900 systems is desirable and a proven record of man-management is important.

2900 SALES SUPPORT STAFF — **c £5,000 p.a.**
We are looking for technical support staff with experience of large 2900 systems (you would also be considered for retraining if you had 1900 experience).
A knowledge of VME/B, 2900 hardware and other 2900 products is desirable as you will be closely involved in both pre-sales support and implementation activities.

1900 SALES SUPPORT STAFF — **c £5,000 p.a.**
You should have gained at least 2 years' experience on large 1900 systems. Your involvement will be in developing and implementing systems for users. A knowledge of 1900 hardware, Cobol, or George operating systems is important.

TECHNICAL SUPPORT (Small Systems) — **c £5,500 p.a.**
The technical expertise needed in supporting either a System 10 or 2903 system does not come quicly. If you have at least 2 years' experience on these systems we can offer you total involvement in a pre-sales support role. A Systems Analysis background is desirable.

TECHNICAL SUPPORT (Communications) — **c £5,500 p.a.**
Preferably you will have had experience of implementing a large TP system. If you have the desire to expand your existing knowledge, we can offer you involvement in both pre-sales support and implementation roles with a variety of users. A knowledge of 1900 or 2900 communications products is desirable.

FOR FURTHER DETAILS TELEPHONE PETER JEZEPH AT OUR CRAWLEY OFFICE 0293 514071 OR YOUR NEAREST ATA BRANCH.
Written applications enclosing detailed c.v. to 36 The Broadway, Crawley, Sussex.

LONDON (01) 637 0781 — 230 Gt. Portland St., W1N 5HG
MANCHESTER (061) 832 5857 — 86 Cross St., M2 4JA
BIRMINGHAM (021) 643 1894 — Wolworth Building, 102 New St., B2 4HQ
BRISTOL (0272) 211036 — Equity and Law Building, 36-38 Baldwin St., BS1 1NR
EDINBURGH (031) 226 5381 — Maple House, 24/26 Frederick St., EH2 2JR
CRAWLEY (0293) 514071 — 36 The Broadway

SYSTEMS SERVICE ENGINEER

Varian's Medical Operations require a systems service engineer for support of computers used in medical applications such as nuclear medicine and radiation therapy.

The successful applicant will be required to carry out field service of sophisticated hardware equipment. This will involve becoming familiar with a variety of test programmes. The post will also require first line maintenance of the operating system and application programmes. The job will require extensive travelling primarily in the UK but also in Europe.

Applicants are expected to have demonstrated an ability to maintain software in the field and to be able to identify and replace defective parts of hardware systems. An ability to repair hardware at the individual electronic component level is not strictly necessary but desirable.

An attractive salary and benefits package is offered.

For application form please contact: Fiona Lilley, Varian Associates Ltd., 28 Manor Road, Walton-on-Thames, Surrey KT12 2QF. Walton-on-Thames 43741

varian

Metropolitan Borough of Wigan
WIGAN (TERTIARY) COLLEGE OF TECHNOLOGY—DEPARTMENT OF MATHEMATICS AND COMPUTING

LECTURER GRADE I in COMPUTER STUDIES

Required as soon as possible, a qualified person with good industrial and/or commercial data processing experience to lecture on a wide range of computer studies courses. Salary £2,499-£4,377 plus supplements of £312 and £132 – £180.
Further particulars and application forms from the Chief Administrative Officer, Parsons Walk, Wigan, WN1 1RR, within 14 days of the date of advertisement.

Reed Executive

The Specialists in Executive and Management Selection

Research and Development

Mini-computers

Based in Yorkshire, our clients have, in less than five years, established themselves as one of Europe's leading suppliers of real-time mini-computer systems. Their success comes not only from an astute commercial approach but also carefully targeted research and development of hardware and software. Expansion and consolidation of the R & D Section will require two new appointments.

Design Engineer — £8-£10,000+car

Most of the work in this post will be concerned with hardware, particularly peripheral equipment. Suitable candidates must be thoroughbred engineers, not necessarily in the classical computer mould, who design strictly with an eye to market requirements and who will not sacrifice practicability for elegance. They must have a proven record of success. (Ref: 3341/CW)

R & D Manager — £8-£10,000+car

The new manager will be responsible to a Main Board Director for co-ordinating the R & D functions, including bought-out work. There will be demanding time schedules to meet and the post requires sympathy with the market place and the production functions. Ideal candidates will have management and administration as their principal skills, combining these with up to date knowledge and experience of mini-computer technology. (Ref: 3342/CW)

Telephone 0532-459181 (24 hr service) quoting the appropriate reference, Reed Executive Selection Limited, 24-26 Lands Lane, Leeds LS1 6LB.

The above vacancies are open to both male and female candidates

London Birmingham Manchester Leeds

UNITED KINGDOM ATOMIC ENERGY AUTHORITY
NORTHERN DIVISION

COMPUTER SYSTEM PROGRAMMER

A requirement for a Computer System Programmer has arisen in the Central Computer Services at the Risley Nuclear Power Development Establishment, Cheshire. The successful man or woman will be involved in the maintenance and development of the operating system on an ICL 2980 computer which has recently been installed at Risley. The duties will entail the development of procedures to facilitate the operation of the System; tailoring the System to meet particular requirements; investigation of Job and System failures, and fault reporting; and the introduction and testing of corrections, replacements and new products.

QUALIFICATIONS AND EXPERIENCE

Applicants should have a good honours degree in Mathematics or Computer Science. Experience in working with a large operating System (preferably on ICL 2900) is desirable. Applicants with alternative qualifications will be considered if they have relevant experience.

TERMS OF APPOINTMENT

Appointment will be to the Scientific Officer or Higher Scientific Officer grade with starting salary within the range £2,300-£3,485 per annum. In addition the following supplements are payable:

i A supplement of £313.20 per annum.

ii A supplement of 5% of total earnings (subject to a minimum of £10.88 per month and a maximum of £17.40 per month).

Excellent service conditions include up to 22 days' annual holidays and other benefits.

For application form, please write—no stamp needed—to: Staff Officer, United Kingdom Atomic Energy Authority, Risley Nuclear Power Development Establishment, FREEPOST, Risley, Warrington WA3 1BR, quoting Reference No. 5932/

Closing date: 22 December, 1977.

Make your future with **UKAEA**

INSTITUTE OF HYDROLOGY

COMPUTER OPERATORS / SHIFT LEADER

Vacancies exist for computer operators/shift leaders at the Institute of Hydrology, a component body of the Natural Environment Research Council. The Institute operates a UNIVAC 1108 computer to process data associated with its research activities and to provide substantial computer facilities for other NERC institutes via a communications network.

The Institute is currently operating a single shift 0830 to 1700 with alternate Saturday mornings as overtime, but 2-shift working will be introduced soon and so the successful candidates must be prepared to undertake shift work.

Qualifications: Preference will be given to applicants having at least 2 years experience of operating a medium-size computer with disc and magnetic tape peripherals and terminals. However, less experienced personnel will be considered and trained if required.

Salary and Conditions: Appointments will be to the Data Processor or Senior Data Processor grade depending on qualifications.

Data Processor £3070 per plus £6 and Stage 2 Supplement — 18 days' paid annual leave.

Senior Data Processor £2075-£2885 per plus £312.20 and Stage 2 supplement 20 days' paid annual leave.

A premium of up to 20 del/cent is given for shift work.

The Institute is situated in pleasant rural surroundings and has an active sports and social club.

Write for application forms quoting reference 524/77 to: The Personnel Officer, Institute of Hydrology, Maclean Building, Crowmarsh Gifford, Wallingford, Oxon, OX10 8BB, or telephone Wallingford 38800.

NATURAL ENVIRONMENT RESEARCH COUNCIL

TECHNICAL AUTHORS

required to write Software Manuals. Experience in Fortran or Cobol.

Contract in Paris.

£5 per hour

Contact: Willin Writing Services Ltd. 0252-41576

SYSTEMS PROGRAMMERS ANALYST/PROGRAMMERS

SALARY £4,500 to £7,500 p.a.
with additional benefit

Alimand Management Services Ltd. have specialised with an acknowledged degree of success in Mini-Computer applications currently concentrated in the banking and financial sectors

Following sure and steady expansion we are currently recruiting efficient and mature personnel to fill interesting and demanding assignments in the UK and the Americas. There are a range of opportunities from one year's experience upward with details of experience to: Alimand Management Services Ltd., 250 Brompton Road, London SW3 2AT.

REQUIRED URGENTLY!

For Home Counties — Midlands — Northern England

FREELANCE OPERATIONS STAFF!

★ LONG CONTRACTS ★ TOP RATES
★ PROMPT PAYMENTS! ★ EXPENSES

CONTRACT OPERATIONS MANAGER

I.C.L. System 4 'J' operating systems must have proven ability and 3+years good supervisory experience on medium - large installation. Immediate start for 1 year+

OPERATORS

I.B.M. 360/370 DOS/VS/POWER/GRASP
I.B.M. 370 OS/VS1/VS2
UNIVAC 1100 EXEC 8
HONEYWELL OS2000 & GCOS
ICL 1900 GEORGE II/II+/III
ICL 2903 EXEC I
ICL System 4 "J" o/s
ICL 2900 VME/B

Trident Computer Services Ltd.

2115 COVENTRY ROAD
SHELDON
BIRMINGHAM
826 3EA
Tel: 021-742 4431

SENTRY HOUSE
110 FRIMLEY ROAD
CAMBERLEY, SURREY
GU15 2QN
Tel: 0276 64252

Licensed by the Department of Employment as an Employment Agency and Employment Business Licence No SE/819

Dunsfold Aerodrome in Surrey

Systems Engineer / Programmer

Hawker Siddeley Aviation

We are still looking for a bright man or woman whose job will be to develop software. Ideally you should have experience with PDP II using FORTRAN and ASEMBLER under RSX-IID Operating System.

If you are that person you would be working in a most interesting environment alongside our Avionics Engineers in a small community at our Dunsfold Aerodrome.

If you do not want to be just another number in a big outfit, this could be the job you are looking for

We will pay you a good salary, the facilities are all you could expect including an active Sports and Social Club, and we will pay re-location assistance if you have to move.

Please write or telephone quoting CW/09 to.

The Personnel Officer
Hawker Siddeley Aviation Limited
Dunsfold Aerodrome, Nr. Godalming, Surrey.
Telephone: Cranleigh 2121

A BRITISH AEROSPACE COMPANY

AP

AUSTIN & PICKERSGILL LIMITED require a

PROGRAMMER/ANALYST

Due to expansion of systems within the company we require a senior person with at least four years' programming experience in a commercial and technical environment. Applicants should have a knowledge of COBOL and FORTRAN and be capable of working on their own initiative.

Salary will be commensurate with experience and responsibilities.

Please write in the first instance for an application form to:

The Personnel Officer, Southwick Shipyard, P.O. Box 38 Southwick, Sunderland, Tyne and Wear SR5 2BJ

Austin & Pickersgill

LINSCOTT Computer Systems Limited

PL1 CONTRACTS

London and Home Counties.

Immediate and New Year starts.

C.V.s to P.O. Box 74, Brentwood Essex CM15 0BZ
Telephone: 0277 212021

PROJECT ANALYSTS AND PROGRAMMERS

South London and Peterborough

We are one of the most successful, progressive mail order companies in the country Our Head Office is in Stockwell, we have satellite offices in other areas of South London and in Sheffield, and our distribution centre is in Peterborough.

Our computer installation — twinned IBM 370/145 and 158 under OS/VS1 and VM/CMS — is at Head Office. The VM usage shortly to be extended to the distribution centre to facilitate on-line programming development by the Peterborough Project team.

We need Analysts, Analyst/Programmers and Programmers to augment our Project Teams, both at Head Office and at Peterborough. Posts involving programming require at least a year's Cobol experience, preferably in an IBM installation. Other posts require varying degrees of experience in Systems Analysis.

There are excellent career opportunities in the Project Team environment of the Management Services Development Department.

Remuneration will be in the range £3,950-£4,750 for Programmers and £3,956-£5,150 for project analysts, depending on experience, and there is a comprehensive range of attractive benefits and options.

Please write, giving details of age, career and current earnings to R. W. Johnson, Employment Manager, Freemans (London, SW9) Ltd., 139 Clapham Road, London SW9 0HR.

freemans
Britain's mail order pace setters

PROGRAMMER

The Computer Department of Univoyal (UK) Limited is currently reviewing its plan for the development of computer systems throughout the UK. To this end the company wishes to recruit an additional COBOL Programmer to be based at our UK Headquarters, Newbridge, Midlothian (at the east end of the M8).

The successful candidate must have at least 2 years experience of COBOL programming in a mixed tape/disc or all disc environment. Knowledge of IBM, ANS, COBOL and DOS/VS power/VS, while not essential, will be considered advantageous, as would knowledge of any other programming language.

Current hardware is an IBM 370/115 with card reader, punch printer, 2 tapes and 4 times 3340 disc drive. An off-line data transmission link is installed.

Univoyal offer a highly competitive salary, first class working conditions and particularly attractive fringe benefits, including relocation expenses.

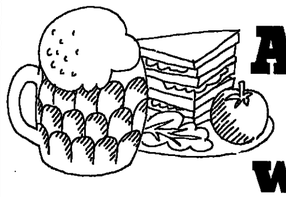
Please write with brief details of experience, qualifications, age and current salary to Mrs. B. White, Personnel Assistant, Univoyal Limited, Newbridge, Midlothian.

Equal consideration will be given to either sex.

UNIVOYAL

Open Day

Another Square One



An informal evening which could change your career

Are you a Programmer in PL/1, Cobol or Assembler, or a Systems Analyst? Are you ready for the challenges and the rewards of consultancy work? If so, then you are invited to the next of the very successful Square One open days.

Come and talk to us over a beer and a sandwich about a worthwhile career where skills and hard work really count. Our immediate requirements are in the City, and there are others over virtually the whole of the Greater London area.

Don't miss it. Square One are good people to work with, and we can promise you an informal but informative evening. (Listen out for our advertisement on Capital Radio this weekend.)

one

Open Day

Monday December 5th 12-2pm or 6-8pm
150 Regent Street London W1 (top floor)

Square One Computer Services Ltd 02405 74161

"Technically speaking, our Data Base development creates a lot of interesting problems..."

Our Clients are a specialised light to medium engineering company based in mid Kent, with factories in Scotland and on the Continent. At present their main Data Processing involvement is in the development of a Company IMS Data Base to handle various commercial applications in the areas of Finance, Production, Administration and Marketing.

They are currently using an IBM 370/158 and an SVS, BASP and TSO, with terminal links to all their sites.

To meet all the challenges of their current development programme, they now need the following experienced people, male or female.

Senior Programmer

To head up a small team of professionals. He/she will have at least four years' experience in COBOL and IBM operating systems. A knowledge of IMS/DL1 and Assembler language would be a distinct advantage, but is not essential as formal training will be given where required.

Analyst/Programmers (2)

To be responsible for the detailed investigation and design of systems, programs and project implementation. He/she will have at least three years' COBOL programming experience with in-depth IBM expertise plus systems analysis experience.

Salaries will be c. £5,500, relocation expenses will be reimbursed where necessary.

If you are interested in the possibilities and rewards involved in our development programme, please send full personal and career details to Position No. AGC 6447, Austin Knight Limited, London, W1A 1DS.

Applications are forwarded to the client concerned, therefore companies in which you are not interested should be listed in a covering letter to the Position Number Supervisor.

UNIVERSITY OF LIVERPOOL

COBOL PROGRAMMER

Applicants are invited for the post of Programmer in the Computer Laboratory. Candidates should have at least one year's experience with Cobol. A degree qualification is an advantage and experience with Filetab or other information retrieval package would be useful. The successful candidate will work with IDMS. Training will be given. Salary within a range up to £4811 p.a. according to age and experience.

Application forms may be obtained from the Registrar, The University, P.O. Box 147, Liverpool L69 3BX. Closing date for applications, 18th December, 1977.

Quote Ref: RV/819/CW.

We would like to remind advertisers that the first INTERNATIONAL EDITION of COMPUTER WEEKLY in 1978 will be on JANUARY 5th. Copy for this issue should arrive at our offices no later than 4.30 pm on FRIDAY, DECEMBER 30th, 1977.

INFORMATICS INCORPORATED

PROUDLY ANNOUNCES THE OPENING OF ITS LONDON CONSULTANCY

Immediate openings now exist within the United Kingdom for Programmers/Analysts and Programmers with commercial systems experience.

Qualified personnel will work alongside our American-trained staff utilising data base, virtual storage, teleprocessing and other state of the art techniques.

For those desiring travel, company paid relocation to North America and Europe for both short and long term assignments also exists.

To arrange for a confidential interview on December 8th and 9th, please send your résumé immediately to our office (address below) or phone our special representative, Mr. L. Levine, at The Royal Lancaster Hotel, telephone number 01-262 6737 commencing Sunday, December 4th.

INFORMATICS INCORPORATED
110-111 THE STRAND
LONDON WC2R 0AA

Systems Analysts & Programmers

Ware, Herts.

Allen & Hanburys Ltd. are a major pharmaceutical manufacturing company and a member of the £multi-million Glaxo Group. Due to an expansion of our Data Processing Department, vacancies have arisen for 2 Senior Systems Analysts and 1 Programmer, to work on a variety of on-line projects.

We offer good working conditions, together with a generous holiday entitlement, a bonus based on Group profitability, pension, life assurance and sick pay schemes, canteen facilities and a lively sports and social club. Please write or ring for an application form to: Mrs. N. M. Moore, Senior Personnel Officer, Allen & Hanburys Ltd., Ware, Herts, SG12 0DJ. Tel: Ware (0920) 3232.

Senior Systems Analysts *c £5,000 inclusive*

Candidates must have had some experience of on-line systems in a commercial environment. An ability to communicate with all levels of management is necessary, as is the ability to control and meet agreed target dates of projects.

Programmer

c £3,100 inclusive

This position would be ideal for a candidate who wishes to move to systems analysis in the future. Not less than 2 years' experience, using a high level language (preferably COBOL and/or BASIC), will be considered.

Allen & Hanburys Limited

New Sales Support & Sales Opportunities — UK

A major international computer manufacturer is announcing in Europe an exciting proven range of small computers in the New Year. They therefore immediately require Branch Managers, Systems Analysts, Salesmen and Technical Support Personnel as well as UK Training Officer. Previous experience should be with RPGII type computers or mini computers using commercial skills with a professional approach to problem solving. Personnel will have a marvellous opportunity to get in on the ground floor where salaries will be very competitive. Vacancies exist in W. LONDON, BIRMINGHAM, MANCHESTER and LEEDS. CW 48/1, Michael.

Operators to Shift Leaders
£2,000-£4,000 (incl.)
LONDON & HOME COUNTIES
We have many vacancies covering all types of machines and locations. Some firms will refrain from one manufacturer to another. Remember these positions are for shift working only. Hurry whilst stocks last. CW 48/2, Patricia.

Technical Authors
W. London & Herts.
£5,000
Four manufacturing companies are looking for competent technical writers with mini or mainframe experience. CW 48/3, Michael.

Systems Consultants
£6,000-£9,500
CENTRAL LONDON
Seven large well established consultancies wish to recruit system people with all-round experience on third generation equipment and the right personality to deal with clients who require a first rate service. Technical communications consultancy are also required where in-depth implementation experience of IBM or ICL T/P message switching networks, etc., are essential. Excellent fringe benefits and prospects. CW 48/4, Michael.

Programmers
Hemel Hempstead
c. £5,000
Are there any of you who have commercial FORTRAN? Good, then this multinational firm in Herts with top perks including free lunches and non-C.P.S. is looking for you! Univac experience would be ideal but other machines acceptable. CW 48/8, Annette.

RPG II Programmers
£4,000-£6,500+
LONDON & H. COUNTIES
We now have eight commercial companies who have vacancies for RPGII programmers and Analyst Programmers. Jobs exist in C. London, W. London, Middx., High Wycombe, Croydon and in Dorset. Most firms offer 4 wks' holiday, etc. CW 48/6, Annette.

Time Sharing Programmers to £6,000
C. LONDON
If you have had some sharing experience involving the use of FORTRAN, BASIC or ASSEMBLER, then we have four reasonably known companies who would offer you an exciting job in pre- or post-sales support. Some offer generous bonus schemes. CW 48/7, Michael.

Contract Programmers to £190 p.w.
U.K.
Immediate requirements for IBM RPG II & IBM COBOL under DOS or OS for C. London PL/1, OS or CICS, PDP/11 or good IMS for various locations for three months plus. Also IBM vacancies in Europe. Ask for the Contracts Officer on 01-996 2236. CW 48/8, Michael.

Senior Programmer
SW1
to £7,500
A very successful commercial service bureau, having an IBM DOS computer, needs an experienced COBOL programmer with more than the average ability. Must enjoy meeting and advising clients. Lvs. C.P.S., etc. CW 48/8, Annette.

DATA EXPRESS HOUSE
PROSPECT PLACE
HEATHFIELD TERRACE
CHISWICK W4 3BR
Recruitment Consultants
01-995 3883 or
01-958 6138 evenings

Analysts

Croydon — **Up to £5,500**

Ready for a Change?

If you find your current job unrewarding our client may be able to offer the interest and variety you seek. You must be a flexible person with a good commercial computing background and be able to deal with all levels of user. In-depth analysis experience is NOT essential.

The aim of the successful applicants will be to ensure the maximum utilisation of the installation's resources and to minimise problems with the implementation and running of projects. They will trouble-shoot difficulties, identifying problem areas.

Responsibilities involve acting as consultant to development, planning and operations sections. Models will be used to evaluate operational implications of system development and in performance monitoring. Investigations may be carried out into hardware constraints and usage.

The company is a major user of data processing equipment and excellent opportunities exist for career progression. Training is given wherever necessary. Starting salary will not be below £4,500 but for a more experienced person this will be negotiable up to £5,500.

To find out more about these interesting and important positions, telephone our CROYDON office or write quoting reference: CW67-7H.

01-686 9693 (24 HOUR ANSAPHONE) | 061 236 2419 FAULKNER HOUSE,
19, PARK STREET, CROYDON, CR9 1TN | FAULKNER STREET, MANCHESTER, M1 4YD

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS
CAPP ASSOCIATES
LONDON AND MANCHESTER
Computing Services Association

computer operator

Required for our Group Data Processing Department which is located at New Malden, Surrey.

The Computer is an I.B.M. 2Mb 370/148 operated on a 3 shift basis under VM-DOS/VS and Power/VS and is used for a wide range of applications embracing many of the Groups activities.

Applicants should have a minimum of 12 months experience on 370 equipment running under DOS/VS (or DOS) with POWER or GRASP. Experience of VM/370 would be an added advantage. The position carries an attractive starting salary and scope exists within the department for further advancement. General conditions of employment are excellent and additional benefits include Canteen meals at token prices, discounts on Company products and a first class Sports & Social Club.

Write or telephone
Personnel Officer, Decca Limited,
Burlington House, Burlington Road,
New Malden, Surrey.
Telephone 01-942 2464.

DECCA — *The Queen's Award for Export Achievement to Decca Ltd 1976*

BRITISH GAS — Share in the future of Britain's Gas

SEGAS — **CROYDON**

ASSISTANT COMPUTER OPERATOR

Salary within £2821-£3430 per annum plus 17½% rotating shift allowance (five-day week)
SEGAS have vacancies for computer staff with 1 to 2 years experience of IBM 360/370 Hardware running under OS and/or VS operating systems.
Our present installation comprises a 1.5 mb 370/145, a 2.0 mb 370/148 and a 0.5 mb Honeywell H4200 operating on a 3 x 8 hour shift/5 day week basis.
We undertake a wide variety of both batch and on-line applications and currently have about 150 remote VDU's installed throughout the Region. IBM software in use includes OS/VSI, VM/370, CMS, VTAM/NCP, CICS and ATMS.
The salary quoted includes London Weighting (where appropriate) plus 1976 and 1977 salary supplements.

* Good working conditions
* Generous holidays
* Sick pay, pension and insurance schemes
* Sports and social facilities

Write giving full details, within 7 days, and quoting ref. F3832A to:
Personnel Manager, Segas, Segas House, Katharine Street, Croydon CR9 1JU

Under normal circumstances applicants will be informed of the outcome of their application within two weeks.

SEGAS

PRODUCT NOTES

Paper shredding unit

A PAPER shredding unit, the Model CC9, which cuts across the paper as well as parallel with its length is now available from Ofrex Ltd of London.

The CC9 produces 1 mm x 10 mm paper chips which, according to Ofrex, ensures security of all discarded documents.

The CC9 has been added to the existing Ofrex Fordlograph shredder range and is a development of the Fordshred 9 which employs parallel cutting only.

According to Ofrex, the design of the CC9 eliminates the overheating problems previously associated with cross cut shredders.

Other CC9 features include a 216 mm (8½ inch) throat which can accept five or six A4 sheets in one pass when working at a rate of 60 feet of paper per minute. The maximum speed is 98 feet (18.3 metres), per minute.

The CC9 is a table top unit weighing 39.6 Kg (140 lbs) and measuring 446 mm (17½ inches) wide, 453 mm (18 inches) deep and 223 mm (8¾ inches) high. It can be supplied with its own mobile trolley.

The CC9 is operated by a two-way forward and reverse switch and automatic overload cut out is a standard feature. Shreds are ejected into a large capacity plastic sack.

Ofrex Ltd (CW), Ofrex House, Stephen Street, London, W1A 1EA. Tel: 01-636 3686.

Disc system

NOW available from Mogul Electronics is the Cosmac floppy disc system (FDS) which is a mass-memory storage unit designed to be used in conjunction with the CDP18S004 Cosmac development system (CDS) in order to facilitate rapid program development.

Enabling significant reductions in program development times compared with other systems the FDS can, for example, permit the assembly of a 1K byte program in 10 minutes compared to a time of one hour with a 10 chps paper tape system, claimed Mogul.

It consists of a dual disc drive mechanism, interface card and ROM set that contains a disc utility and monitor program together with a system diskette which holds the assembler, editor, diagnostics, tape to diskette transfer, diskette copy, memory save and demonstration programs.

Mogul Electronics Ltd (CW), 273 High Street, Epping, Essex, CM16 4DA. Tel: Epping (78) 77366.

Recorder

IN the wake of its Model 715 low cost data cassette recorder, MS Instruments has introduced a remote control version.

Named Model 716, it has standard piano key type switches with which to manually instigate "stop", "read", "write", "fast forward" or "reverse" functions together with the added facility in the read and write modes of remote start and stop. This is done via a teletype signal.

A "busy" signal is also available which inhibits data being admitted or transmitted until the recorder has attained its normal operating speed.

Capable of being connected via the normal Teletype, CCITT V24 or 5V TTL logic interfaces provided by computer manufacturers, the Model 716 utilises either standard audio or 300 feet computer grade cassettes — both having breakout lugs for overwrite protection.

The maximum data rate is said to be 2.4K baud and the Model 716 costs £450 f.o.b. London in one-off quantities with delivery dates being four weeks from the receipt of orders.

MS Instruments Ltd (CW), Rowden Road, Beckenham, Kent, BR3 4NA. Tel: 01-650 7255.

THE SALES BIT

Recruiting through an agency

FOR many sales managers the use of recruitment agencies has effectively become a reflex action. No real consideration is given to alternative methods of personnel location and there is no formal justification for the significant cost which is implied by each recruitment exercise using this medium.

The question must be asked, what can a recruitment agency do and/or what does it have available that one could not do better or make available oneself?

It is not simply a matter of deciding whether or not to utilise the services of a recruitment agency; by far the more important question is, which one?

A truly effective agency for the recruitment of sales and marketing personnel, must have the resources to provide management with the following facilities/benefits:

1. better utilisation of time/resources;
2. details of currently available candidates;
3. advertising at reduced prices;
4. creation and co-ordination of recruitment campaigns;
5. integration of advertising with company-wide public relations activity;
6. in-depth experience of sales management and selling within the computer industry; and
7. meaningful knowledge of the marketplace related to a particular job assignment.

Most recruitment agencies can satisfy the demands of the first four items, but when it comes to the location and selection of sales and marketing personnel there are very few organisations who are equipped to offer such a comprehensive service.

I cannot think of more than four agencies who might stand a chance of meeting this qualification. So how do you discover which is which?

In my opinion the best approach is to invite a selection of those agencies purporting to be involved in recruiting salesmen to discuss your business situation and discover what real experience they have of knowing what salesmen look like and what real knowledge they have of your marketplace.

Those who convince you that they would do the job at least as well as you, should be given a thorough understanding of the company's sales and marketing strategy and be retained for ongoing staff requirements.

There are basically three forms of recruitment agency: Where records of known "live" candidates are matched with "job orders". The initial action is taken by the salesman who makes known his desire to change jobs. He is asked to complete a job application form and then subjected to a face-to-face interview by an appropriate consultant who is responsible for producing a formal written evaluation, but not usually in the context of a particular job or company. His capability is then matched with the requirements of existing job-assignments, and if necessary, appropriate potential employers, agreed with the candidate, are also approached.

Typical charges for this type of service vary from 15% to 20% of the salesman's guaranteed income for the first year of employment, depending on the level of income involved.

Advertising: where the appropriate advertisement is created, response is filtered and "long-list" applicants interviewed so that the client's first involvement after the initiation stage is the interviewing of "short-list" candidates.

Typical charges for this service are similar to agency fees, but also include the cost of advertising, artwork, the production of printing plates and other related expenses.

"Head-hunting": This method of recruiting is obvious, but it is usually limited to clearly identifiable people in very specific jobs. Consequently, salesmen are seldom involved in this approach, it is more typically senior management and specialist technicians.

Charges can range from 25% to (I have heard it said!) over 50% of the first year's basic salary.

Some agencies will give either a refund or a free-replacement in circumstances where a candidate leaves his job soon after joining. This "guaranteed" period is typically between one to three months.

For the first few weeks it is difficult for the sales manager to know if his newly acquired salesman is a good buy or a goodbye.

However, if he's got his counselling and appraisal right he should soon see the early warning signs of the misfit.

He should also be aware of the implications of the Employment Protection Act.

In other words the period of evaluation should be a maximum of three months.

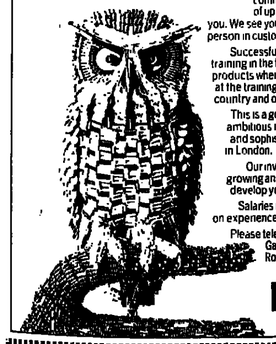
My reaction is that total refunds and free-replacement is too extreme. I would much rather see a sliding scale of compensation which keeps the pressure on both the sales manager and the recruitment agency to "get it right". Say, 75% within the first month, 50% within the second and 25% within the third.

TRADER

Puzzle answer

ONLY square numbers have an odd number of divisors, and the additional "one divisor" condition means that 36 must be prime. This leaves just 11, 13, 17, 19, 23, 29 and 31 as possibilities — and only 29 = 84 meets the other requirement.

At Honeywell we put our Lecturers in a class of their own



As a highly respected multi national computer manufacturer with a world-wide reputation for commercial success, Honeywell places an unusually high value on the quality of its customer support and education success. It places the same high value on its lecturers.

As part of a continuing programme we are seeking top quality lecturers and potential lecturers with suitable experience to join the staff at our customer education centre at Hammersmith, West London.

You may already have had lecturing experience or you might be a systems analyst or programmer who wishes to move into lecturing. In either case, if you are a good communicator, capable of handling classes of up to 30 people, Honeywell has much to offer you. We see you as perhaps the most important person in customer support.

Successful candidates will receive a comprehensive training in the techniques of lecturing and on Honeywell products where necessary prior to commencing teaching at the training centre and at customer locations in this country and overseas.

This is a good opportunity for dedicated and ambitious men and women to enter into an extensive and sophisticated training environment, handily based in London.

Our investment in the customer education area is growing and there will be ample opportunity for you to develop your own potential.

Salaries range from £4000 to £6000 depending on experience plus a benefits package.

Please telephone or write for an application form to Garnick Fraser, Honeywell House, Great West Road, Brentford, Telephone 568-9191 ext 382.

Honeywell

THE HATFIELD POLYTECHNIC
Computer Centre

Systems Programmer

£3988-£4735

Vacancies exist in our systems software team, which is responsible for the enhancement and maintenance of operating systems software on our DEC system-10 and its communications sub-systems. Our current major interest is in the development of front-end processors/network systems using PDP-11's. Experience of assembler level programming on any computer system is essential.

For further information and an application form telephone Gordon Brand, Hatfield 68100, Ext. 407, or write to the Staffing Officer, The Hatfield Polytechnic, P.O. Box 109, Hatfield, Herts AL10 9AB.

Please quote reference 953/C. Closing date 9.12.77.

CAPITAL APPTS. — 29 Whitcomb St., London W.1.

GRADUATES

Urgently required for above positions. Industrial, Scientific, Commercial Situations. Salaries c. £3 000.

ALL AREAS

6371551 day, 6369659 eve.

Systems Development Manager

up to £7,250

IMI Rod & Wire is a major producer of extruded and drawn copper-based products for the electrical, fluid power, building and engineering industries. As a member of the IMI Group it is amongst the largest users of the Company's Midlands Computer Centre which operates an IBM 370/145.

A DP specialist is sought for the post of Systems Development Manager who has sound professional experience, degree level qualifications coupled with a good intellect and the ability to provide dynamic leadership to the small team of analysts and programmers who provide a full systems service to IMI Rod & Wire. Above all, the man or woman appointed must relate the effectiveness of the team to the economic success of the business. Ability and drive are considered to be more important than age.

Batch and on-line systems are currently at different stages of development and inter-active systems are planned using both database techniques, on the IBM 370, and a new mini-computer.

The Manager will be responsible to the Chief Accountant for ensuring that these projects provide an extensive, management information system and make a fundamental impact on profitability. Close liaison with the Managing Director and other Directors of IMI Rod & Wire is essential.

The conditions of service are commensurate with the key nature of this post. Include an attractive salary package and reflect the benefits associated with a large Group. Relocation assistance with moving to the Birmingham area will be given if necessary.

Written or telephone applications should be made to: K Wigfield, Personnel Manager

IMI ROD & WIRE

Imperial Metal Industries (Kynoch) Limited
Rod & Wire Division
PO Box 216 Kynoch Works Witton Birmingham B6 7BA
Telephone: 021-356 4848

STERLING

SYSTEMS ANALYST
(Commercial Systems)

Part of an international group with our headquarters located in rural surroundings, we are one of Europe's foremost designers, and manufacturers of industrial electric cables, supplying nationalised industries, oil refineries, steel companies, chemical plants, etc., at home and abroad.

We are setting up a new team to develop a wide range of computer applications, mainly operating On-line. A technical analyst is required to take control of Commercial Systems development including sales order entry, sales analysis and sales, bought and nominal ledgers. The person appointed will not be expected to program, but a sound programming background is essential, preferably with On-line experience on ICL 2903-4 equipment.

Applications are invited from persons up to the age of 30 years with at least one year's experience as a commercial systems analyst. An attractive salary will be negotiated and benefits include four weeks annual holidays after one year's service and a pension scheme.

For an application form, telephone or write to Mr. J. W. Heading, our Recruitment Officer, Sterling Cable Company Limited, Bath Road, Aldermaston, Reading RG7 5QD. Tel. Woolhampton 3221.

University of Bradford
ASSISTANT COMPUTER OFFICER/ COMPUTER OFFICER

Applications are invited from graduates or professionally qualified people for an appointment in the Data Processing Division of the Bursar's Department. The duties will involve systems analysis and programming in administrative routines in the Finance, Registration and Library Divisions/Departments, and applicants should have practical experience of COBOL with a 2904 ICL installation. Salary is on a scale £2804-£4190 per annum (Assistant Computer Officer) or £2904-£4811 per annum (Computer Officer). Application forms are available from the Personnel Office, Room E47, University Main Building, Richmond Road, Bradford 7. Telephone Bradford 33466 ext. 252. Please quote reference BD/DPR/ACO/CO/CW.

COURSES

MICROPROCESSORS
UNIVERSITY OF SALFORD
DEPARTMENT OF ELECTRICAL ENGINEERING
SHORT ADVANCED COURSE OF MICROPROCESSORS
PRINCIPLES AND APPLICATIONS
9.15 a.m. to 4.30 p.m. each Monday, 9th January to 13th March (ten weeks). Course fee £160. Further details from Administrative Assistant (short courses), University of Salford, Salford M5 4WT. Tel. 061-736 5843 Ext. 860.

CITY OF BIRMINGHAM POLYTECHNIC
DEPARTMENT OF MECHANICAL & PRODUCTION ENGINEERING
Three-day short course:
AN INTRODUCTION TO MICROPROCESSORS
21st-23rd February, 1978
For further information please contact: Departmental Secretary, Department of Mechanical & Production Engineering, City of Birmingham Polytechnic, Perry Barr, Birmingham B42 2SU. Tel. 021-356 6911, Ext. 272.

COMPUTER SYSTEMS ANALYSIS COURSE
16th January - 3rd February 1978
A 3-week course for trainee systems analysts with experience in programming or O&M or operational research. Also for user staff involved in systems analysis work within their function or line management services.
Reservations by telephone or letter to Registrar, Urwick Management Centre, Baylis House, Stoke Poges Lane, Slough, Berks, SL1 3PF. Telephone: Slough 34151.

SURREY/SUSSEX WHY COMMUTE

EGHAM	Systems Designers	£6k
GODALMING	Cobol Programmer	c. £5.3k
LEATHERHEAD	Programmers, Assembler or Cobol	c. £5k
RIEGATE	System Programmer	c. £5k
WALTON-ON-THAMES	System Analysts	c. £5k
WOKING	Cobol Programmer	c. £5k
CRAWLEY	Commercial Analyst	£4.5k
CRAWLEY	Cobol Programmer	£5k+
CRAWLEY	Analyst/Programmer	£4.5k
HAYWARDS HEATH	System Analyst	£4.5k
		£5k+

Please Telephone Weybridge 41321 for more information

ee executive (Weybridge)

COMPUTER PERSONNEL SAUDI ARABIA

EDP Operator and Computer Programmer with PDP II programming experience. Two-year contract. High tax free Salaries plus accommodation.

Rush résumés quoting reference C.W.

To: Advance Personnel Services
The White House
12a Lodge Road
London, NW4
or Phone: 01-203 4272

ajk Look Forward to a Prosperous New Year with AJK

Shift Leader
IBM 370/DOS, POWER, CICS, experience. Self motivation and an ability to work by oneself are important qualifications. Two shift system.
E.C.3
to £4700

Mini-Operator
Mini computer operator with Accounts experience preferred for shipping company. This is a senior position. Days only.
E.C.3
£3500

Operator
Two years' plus experience of ICL 1900 GII, with knowledge of MACRO writing secures this operating position. They also give L/Vs and a meal allowance. Two shifts.
S.W.1
£3550 +

Shift Leader
A shift leader with 3 years' ICL 1900 GII experience. Must be willing to work 3 shifts.
SURREY
£3800-£4000 sae

Above are just a selection of vacancies we have available

AJK Recruitment Limited
26 Chilworth Street, London W2 6DT
01-402 0933
Employment Agency/Licence No. SE(A)1462

FREELANCE/CONTRACT PROGRAMMERS

Earn up to £300 per week

UK & EUROPE

Phone: 01-262 6621

C.E.B. Ltd.